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PHYCOLOGIA AUSTRALICA;

OR,

A History of Australian Seaweeds;

COMPRISING

COLOURED FIGURES AND DESCRIPTIONS
OF THE MORE CHARACTERISTIC
MARINE ALGÆ OF NEW SOUTH WALES, VICTORIA, TASMANIA,
SOUTH AUSTRALIA, AND WESTERN AUSTRALIA,
AND
A SYNOPSIS OF ALL KNOWN AUSTRALIAN ALGÆ.

VOL. III.,

CONTAINING PLATES CXXI.-CLXXX.

BY

WILLIAM HENRY HARVEY, M.D., F.R.S.,
MEMBER OF THE ROYAL IRISH ACADEMY, FELLOW OF THE LINNÆAN SOCIETY, COR. MEM. OF THE ROYAL ACADEMIES OF UPSAL AND MUNICH; OF THE IMP. ACAD. LEOP. CÆSAR. NAT. CURIOSORUM; HON. MEM. OF THE LYCEUM OF NAT. HIST., NEW YORK, ETC. ETC. ETC.,
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TO

FERDINAND MUELLER, M.D., PH.D.,

F.L.S., F.R.G.S.,

MEMB. IMP. LEOP. CAR. ACAD., ETC. ETC. ETC.,

GOVERNMENT BOTANIST FOR THE COLONY OF VICTORIA, AND DIRECTOR OF THE BOTANIC GARDENS, MELBOURNE,

BY WHOSE UNTIRING ZEAL AND ENERGY,

WHETHER IN THE CAPACITY OF A PRIVATE CITIZEN,

OF AN EXPLORER OF NEW REGIONS,

OR OF A GOVERNMENT OFFICER,

OUR KNOWLEDGE OF AUSTRALIAN BOTANY,

IN ALL ITS BRANCHES,

HAS BEEN VERY LARGELY EXTENDED,

The Third Volume of the 'Phycologia Australica'

IS DEDICATED,

WITH EVERY FEELING OF RESPECT AND ESTEEM,

BY HIS FAITHFUL FRIEND,

THE AUTHOR.

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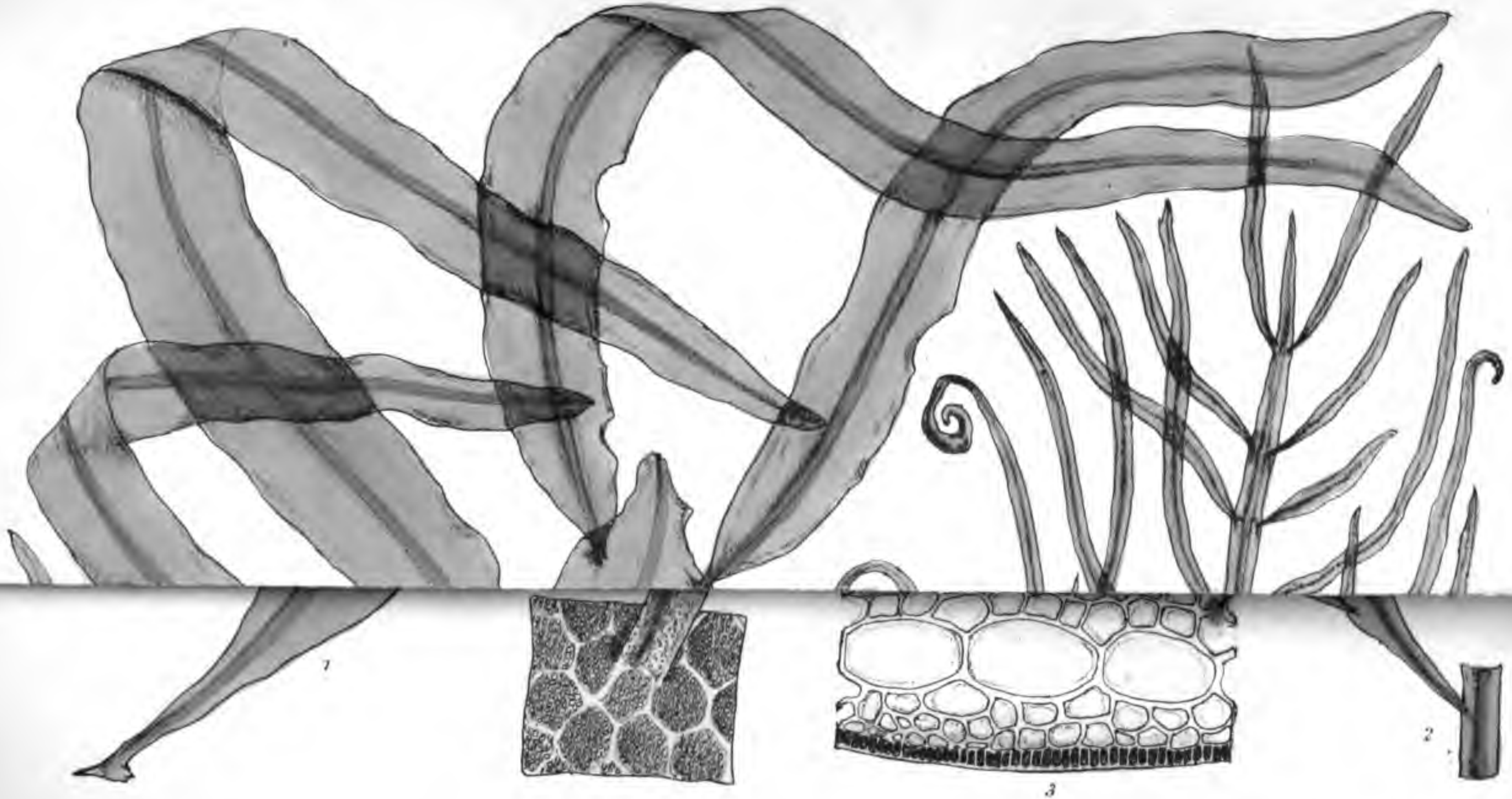

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Plate CXXI.

SARCOMENIA DELESSERIOIDES, *Sond.*

Gen. Char. *Frond* flat and midribbed, or compressed, or terete, inarticulate, pinnately decompound or proliferous, carnoso-membranaceous, composed of two strata of cells; the inner stratum of oblong, thick-walled, gelatinous cells, in several rows; the outer of a single row of minute, coloured, vertical cellules. *Fructification:* 1, pedicellate, thick-walled *ceramidia*, containing a tuft of branching spore-threads, bearing pyriform spores; 2, lanceolate *stichidia*, containing tripartite *tetraspores* in a single or double row.—Sarcomenia (*Sond.*), from *σαρξ, flesh,* and *ὑμην, a membrane.*

Frons plana, costata; v. compressa; v. teres; continua, pinnatim decomposita v. e disco prolifera, stratis duobus contexta; strato medullari ex cellulis magnis oblongis gelineis crassis, peripherico ex cellulis minutis coloratis serie simplici dispositis verticalibus evoluto. Fruct.: 1, *ceramidia pedicellata intra pericarpium crassum ostiolo pertusum sporas pyriformes in filis ramosis terminales foventia;* 2, *stichidia lanceolata tetrasporas triangule divisas uni-biseriatas continentia.*

Sarcomenia *delesserioides;* frond flat, midribbed, lanceolate or linear-lanceolate, proliferously pinnate, decompound; pinnæ and pinnules opposite, springing from within the margin of the frond, attenuate at each end; ceramidia globose, stichidia lanceolate, simple or compound, both scattered over the frond.

S. delesserioides; *fronde plana costata lanceolata v. lineari-lanceolata prolifere pinnatim-decomposita; pinnis pinnulisque oppositis e disco enatis basi et apice attenuatis; ceramidiis globosis stichidiisque lanceolatis simplicibus v. compositis per totam frondem dispersis.*

Sarcomenia delesserioides, *Sond. Bot. Zeit.* 1845, *p.* 56. *Pl. Preiss. v.* 2. *p.* 194. *Harv. Alg. Exsic. Austr. n.* 141; *but not Harv. Ner. Austr. p.* 21. *Kütz. Sp. Alg. p.* 880. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 537.

Var. α. latifolia; *phyllodiis lato-lanceolatis. Harv. Trans. R. I. Acad. l. c.*

Var. β. lancifolia; *phyllodiis lineari-lanceolatis. Harv. l. c.*

Var. γ. cirrhosa; *phyllodiis angustissimis, supremis sæpius cirrhiferis. Harv. l. c.*

Hab. Swan River, *Preiss.* Abundant at Garden Island, near Fremantle; the three varieties, *W. H. H., G. Clifton.* At Shortlands Bluff, Port Phillip, rare, *W. H. H.*

Geogr. Distr. Western and southern coasts of Australia.

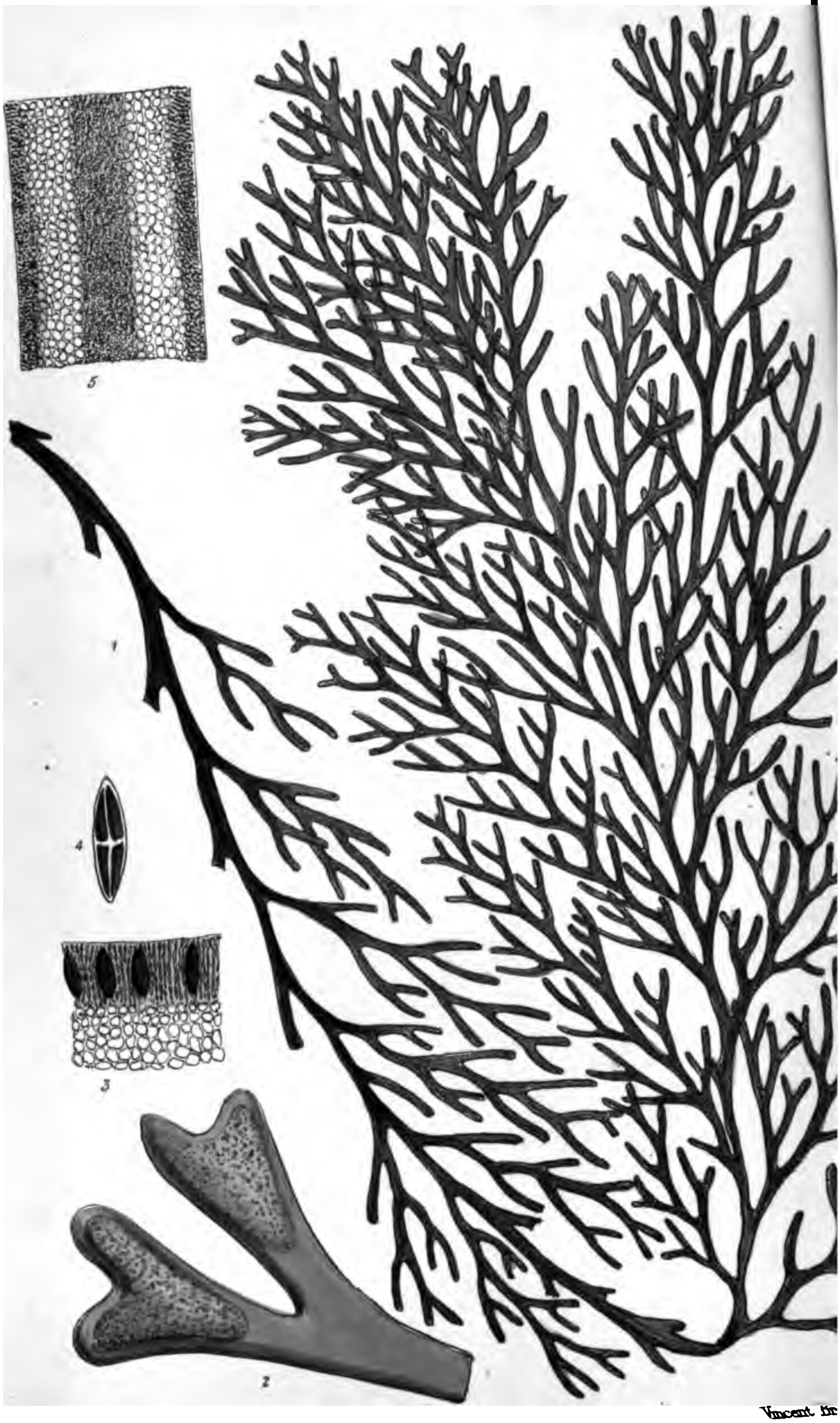
Descr. *Root* a disc throwing out branching fibres. *Fronds* tufted, 1–3 feet long, originating in an undivided, lanceolate *phyllodium,* 6 inches to 1–2 feet in length, and varying in width from 2 lines to 1½ inch. This primary frond is traversed by a more or less evident midrib, and emits, from points always within the margin, numerous opposite pairs of similar fronds, which form the *primary pinnæ*; these emit *secondary*, similar pinnæ; and in old specimens a third, and sometimes a fourth, series is similarly developed. This proliferous branching is very constant; the prolifications springing from the same points, and being almost constantly exactly opposite in their insertion. Sometimes the ends of the branches, in narrow individuals, are drawn out into long, clasping tendrils. *Ceramidia* thickly sprinkled over the surface of the phyllodia, both primary and secondary globose, depressed at the summit, raised on pedicels ½ a line long, and containing a large tuft of pedicellate, pear-shaped spores. *Stichidia* also scattered, lanceolate, containing a double row of roundish tetraspores. *Colour*, while growing, a *grey*, with iridescent tints, but rapidly changing in the air, or in fresh-water, to a bright rosy-red, which latter tint is well preserved in drying. *Substance* cartilaginous, at first crisp, very rapidly becoming flaccid, and in the course of a few hours decomposing in fresh-water. In drying this plant adheres strongly to paper.

This, the typical species of *Sarcomenia*, as already remarked under *S. hypneoides* (Tab. XII.), varies extremely in breadth, but scarcely in any other character. The broad-fronded individual represented at Fig. 1 in our Plate, grew along with that shown at Fig. 2, which, though narrow, is by no means the narrowest that occurs. It has been chosen for illustration because it combines the general characters of the ordinary narrow form, with the cirrhiferous extremities that particularly mark a still more depauperated variety.

Some of the narrow-fronded specimens are very much branched, resembling luxuriant states of *Delesseria crassinervia*, while the broad-fronded approach in aspect *Del. coriifolia*,—a rare species of Western Australia that I formerly (Ner. Austr. p. 21) confounded with this plant. The resemblance to the *Delesseriæ* is merely external, the structure of frond and characters of fruit being widely different. In structure and fruit *Sarcomenia* completely agrees with *Rhodomelaceæ*, and may stand either near *Odonthalia* or *Dasya*. An unfigured species (*S. dasyoides*) very closely connects it with the latter genus.

Fig. 1. SARCOMENIA DELESSERIOIDES, var. α, LATIFOLIA. 2. Var. β, passing into var. γ:—both *the natural size*. 3. Section, to show the cellular structure. 4. A ceramidium. 5. Spores from the same. 6. A stichidium. 7. A tetraspore:—the latter figures variously *magnified*.

Plate CXXII



Vincent Br

PLATE CXXII.

ACROPELTIS ELATA, *Harv.*

GEN. CHAR. *Frond* stipitate, flat, imperfectly midribbed below, dichotomo-pinnatifid, distichous or proliferous; composed of three strata; the *medullary* of very slender, longitudinal, closely packed filaments; the *intermediate* of roundish angular cells; the *cortical* of minute, vertically seriated, coloured cellules. *Fructification:* 1, *cystocarps* . . . ?; 2, shield-like *nemathecia,* in the tips of the branches, containing *cruciate* tetraspores.—ACROPELTIS (*Mont.*), from ακρος, *the summit,* and πελτη, *a small shield;* alluding to the shield-like, terminal nemathecia.

Frons stipitata, plana, inferne obsolete costata, dichotomo-pinnatifida, disticha v. prolifere ramosa, ex stratis tribus formata; stratum medullare ex filis tenuissimis creberrimis longitudinalibus, intermedium cellulis rotundato-angulatis, corticale cellulis minimis coloratis verticaliter seriatis constitutum. Fructus: 1, *cystocarpia ignota;* 2, *nemathecia convexa, clypeiformia, infra apicem frondis evoluta, tetrasporas cruciatim divisas foventia.*

ACROPELTIS *elata;* very tall, and much divided; stem elongate, plano-compressed, channelled when dry, branched; branches prolonged into multipartite, dichotomo-pinnate, rigidly membranaceous fronds; rachis flexuous; segments narrow-linear, dichotomous, erecto-patent; apices obtuse; axils rounded.

A. elata; *fronde longissima multipartita; caule elongato plano-compresso costato siccitate subcanaliculato ramoso; ramis in frondes pergamenas inferne subcordatas dichotomo-pinnatas abeuntibus; rachide flexuosa; laciniis alternis anguste linearibus dichotomis erecto-patentibus; apicibus obtusis; axillis rotundatis.*

RHODYMENIA elata, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 554; *Alg. Austr. Exsic. n.* 378.

HAB. South coast of Rottnest Island, near the lighthouse, *W. H. H.*

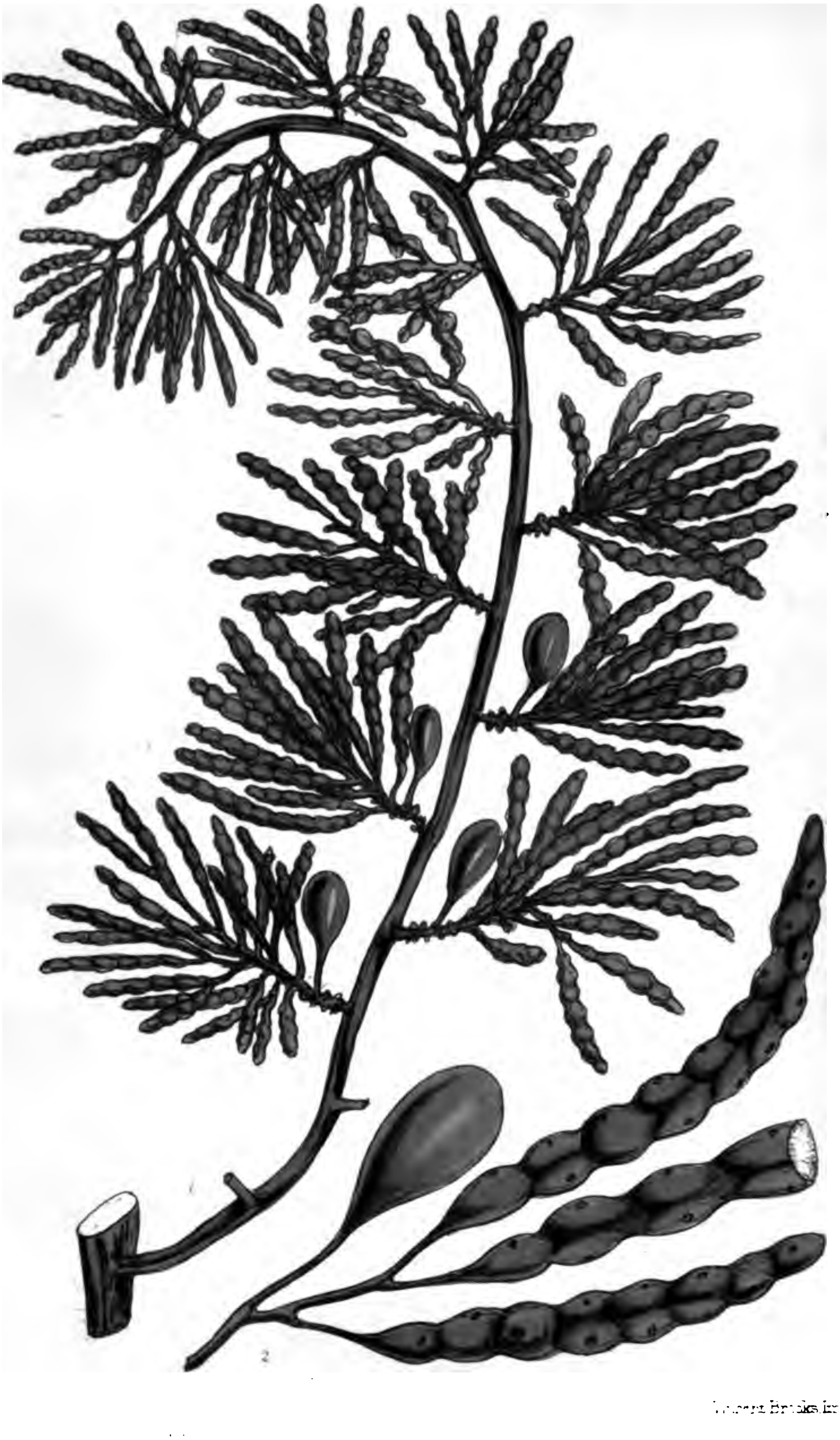
GEOGR. DISTR. Western Australia.

DESCR. *Root* a small disc. *Fronds* 2–2½ feet high, very much divided, and the old fronds irregularly proliferous. *Stem* 6–8 inches to a foot long, 1–1½ line wide, thickened or ribbed in the centre, irregularly branched. *Branches* 12–14 inches long, alternately bi-tripinnate, the pinnæ and pinnules subdichotomous, flexuous, the older ones imperfectly costate, all preserving nearly an equal breadth of 1–1½ line. Margin quite entire, slightly thickened. Apices obtuse, either rounded or emarginate. *Nemathecia* placed immediately below the apices, conforming to the shape of the apex, convex, containing cruciate tetraspores. *Colour* a clear, full red, inclining to purple; the surface rather glossy when dry. *Substance* very rigid, horny, membranaceous, enduring exposure or long immersion in fresh-water without injury. In drying the frond does not adhere to paper.

* * *

The genus *Acropeltis* was founded by Montagne on a South American species (*A. Chilensis*), which I have not seen; to this I formerly added the Australian *A. phyllophora*, and more recently the present elegant plant. That these two Australian species are congenerous I have no doubt, but whether they agree generically with the American is a point as yet undecided. Professor J. Agardh places *Rhodymenia australis*, Sond., also in *Acropeltis;* but to me that appears to be a genuine species of *Rhodymenia.* The same author refers the genus to the *Sphærococcoideæ,* a position which cannot be determined until the cystocarpic fruit of the typical species shall be discovered. In placing *Acropeltis* provisionally in *Rhodymeniaceæ,* I am guided more by external habit than by other considerations. Possibly, taking into consideration the fibrous medullary stratum, it would be better placed either in *Gelidiaceæ* or in *Cryptonemiaceæ.* The structure of the cystocarp must be known before this point be settled.

Fig. 1. ACROPELTIS ELATA, a branch,—*the natural size.* 2. Apices, with nemathecia. 3. Section through a *nemathecium.* 4. A tetraspore. 5. Transverse section through the frond:—these figures variously *magnified.*



Vincent Brooks, Imp.

PLATE CXXIII.

CYSTOPHORA TORULOSA, *J. Ag.*

GEN. CHAR. *Root* scutate. *Frond* pinnately decompound, dendroid, with distinct stem, branches, and ramuliform leaves. *Vesicles* stipitate, simple, rarely absent. *Receptacles* pod-like, torulose or moniliform, developed in the ramuli. *Scaphidia* hermaphrodite. *Spores* obovoid. —CYSTOPHORA (*J. Ag.*), from *κυστις, a bladder*, and *φορεω, to bear.*

Radix scutata. Frons pinnatim decomposita, dendroidea, caule proprio, ramis foliisque ramuliformibus donata. Vesiculæ stipitatæ, simplices, raro deficientes. Receptacula siliquæformia, torulosa v. nodulosa, apice ramulorum evoluta. Scaphidia hermaphrodita.

CYSTOPHORA *torulosa;* stem compressed, subsimple, alternately pinnate; pinnæ issuing from the flattened side of the stem, bent downwards at their insertion, short; pinnules crowded, subfasciculate, subsimple, converted into torulose, club-shaped receptacles; vesicles roundish-elliptical.

C. torulosa; *caule compresso simpliciusculo alterne pinnato; pinnis a latere plano caulis egredientibus retrofractis; pinnulis subfasciculatim approximatis simpliciusculis in receptacula clavæformia torulosa abeuntibus; vesiculis sphærico-ellipsoideis. J. Ag.*

CYSTOPHORA torulosa, *J. Ag. Sp. Alg. p.* 243. *Harv. in Hook. Fl. N. Zeal. v.* 2. *p.* 214; *Hook. Fl. Tasm. v.* 2. *p.* 283.

BLOSSEVILLEA torulosa, *Dcne. Arch. Mus. v.* 11. *p.* 147. *Kütz. Sp. Alg. p.* 628.

CYSTOSEIRA torulosa, *Ag. Sp. Alg. p.* 76; *Syst. p.* 290. *A. Rich. Fl. N. Zeal. p.* 139.

FUCUS torulosa, *R. Br. in Turn. Hist. Fuc. t.* 157.

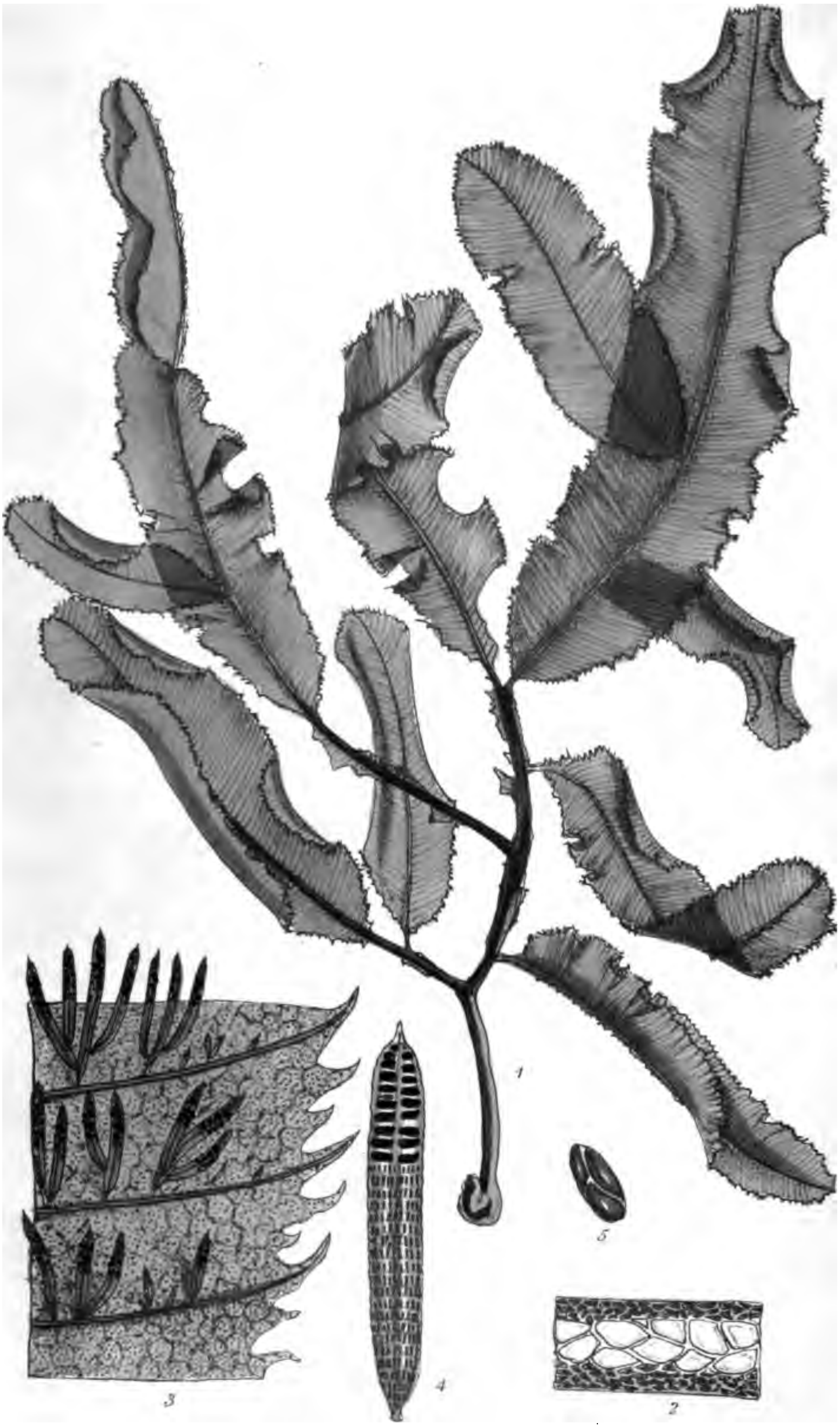
HAB. On rocks near low-water mark. Kent Islands, *Dr. R. Brown.* Western Port, Victoria, *W. H. H.* Common in Tasmania, *Gunn, etc.* "West coast of New Holland," *fide Mus. Paris.*

GEOGR. DISTR. Southern coasts of Australia, Tasmania, New Zealand.

DESCR. *Root* a callus. *Fronds* several from the same base, 12–18 inches long, compressed, rounded at the edge, simple or alternately branched, beset throughout with short, alternate, horizontal branchlets, issuing from the flattened side of the stem or primary branches, and deflexed at their insertion. *Branchlets* (or *pinnæ*) 2 inches long, flexuous, alternately tubercled at the base, very closely ramuliferous; the ultimate ramifications (or *pinnules*) subfasciculate, simple or forked, linear-clavæform, very obtuse, afterwards mostly changed into receptacles. *Vesicles* solitary, pedicellate, near the base of the branchlets, obovate-elliptical, muticous, 5–6 lines long, 2–3 in diameter. *Receptacles* simple or forked, torulose, blunt, ¾–1 inch long, 1½ line in diameter, very abundant. *Colour* a dark olive-brown, turning black in drying. *Substance* coriaceous, hard and somewhat brittle when dry. It does not adhere to paper.

A common littoral species of Bass's Straits, at both sides of the Channel, and on the Islands. It frequently grows in tide-pools, and is then much dwarfed, and apt to become extremely bushy from the enormous development of short crowded ramuli. It is readily known from others of the genus by its robust, club-shaped, and imperfectly constricted, obtuse receptacles. I have not seen any specimens from the west coast.

Fig. 1. CYSTOPHORA TORULOSA; a branch,—*the natural size*. 2. Receptacles, and a vesicle; somewhat *magnified*.



Vincent Brooks, Im

PLATE CXXIV.

DICTYMENIA FRAXINIFOLIA, *Harv.*

GEN. CHAR. *Frond* flat, membranaceous, midribbed, alternately decompound, pinnatifid or rarely foliiferous, areolate; the *medullary* cells large, twelve-sided, colourless, transversely set; the *cortical* minute, irregular, coloured. *Fructification:* 1, ovate, stipitate *ceramidia,* containing a tuft of pear-shaped spores; 2, simple or branched *stichidia,* containing tripartite *tetraspores.*—DICTYMENIA (*Grev.*), from *δικτυον, a net,* and *ὑμην, a membrane,* because the membrane appears areolated (under a low magnifying power).

Frons plana, membranacea, costata, alterne decomposita, pinnatifida v. raro foliifera, areolata; strato medullari ex cellulis magnis hyalinis dodecahedris transversim ordinatis, corticali ex cellulis minutis coloratis irregularibus formato. Fruct.: 1, *ceramidia pedicellata; stichidia propria, simplicia v. ramosa, tetrasporas* 1–2-*seriatas triangule divisas foventia.*

DICTYMENIA *fraxinifolia;* stem cylindrical, thick and rigid, branched, the branches bearing leaves; leaves (*phyllodia*) oblong, obtuse at each end, midribbed and closely penninerved, sharply serrulate; nerves setigerous, midrib serrated; stichidia linear, simple or compound, mucronate, borne on the nerves.

D. fraxinifolia; *caule cylindraceo crasso duro ramoso, ramis foliiferis, foliis (phyllodiis) oblongis basi et apice obtusis costatis et creberrime penninerviis argute serrulatis, nervis setigeris, costa serrata, stichidiis linearibus mucronatis simplicibus compositisve e nervis enatis.*

DICTYMENIA fraxinifolia, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 538.

EPINEURON fraxinifolium, *Harv. MSS. Kütz. Sp. Alg. p.* 849.

AMANSIA fraxinifolia, *Ag. Syst. Alg. p.* 247.

DELESSERIA fraxinifolia, *Grev. Syn. p.* xlvii.

FUCUS fraxinifolius, *Mert. Turn. Hist. t.* 193.

HAB. Rottnest Island, Western Australia, *W. H. H., G. Clifton.*

GEOGR. DISTR. Peninsula of India, and Ceylon. Western Australia.

DESCR. *Root* a hard, knobby disc or bulb. *Stem* (formed out of the thickened and denuded midrib of a primordial phyllodium) 2–6 or 8 inches long, ½ line to 1½ line in diameter, very rigid, woody when dry, simple or irregularly branched, the branches more or less winged with the remains of a dilapidated lamina. *Leaves* either continuous with the branches, or springing irregularly from their sides, 3–6 inches long, ¾–1 inch wide, rigidly

membranous, undulate or much curled, linear-oblong, very obtuse at each end, sharply lacero-serrate throughout, midribbed and closely penninerved with slender, parallel, patent veins. The midrib is serrated at back, and the veins generally rough with proliferous processes, some of which are converted into fruit. Young leaves always spring from the midribs of the older. The *cystocarps* are unknown. *Stichidia* are abundantly borne on the nerves: they are narrow-linear, mucronate, simple or proliferously compound, containing a double row of vertically flattened tetraspores. The *surface-cellules* are minute; the areolations, seen under a moderate lens, are indicative of the large central cells of the frond. *Colour*, when recent, a very deep full red, slightly purplish; when dry red-brown or brown. *Substance* very crisp and rigid. It does not in the least adhere to paper in drying.

A rare species, and interesting as one of the few *Dictymeniæ* that are found within the tropical as well as temperate zones. It was first described by Turner, from an East Indian specimen, preserved in Vahl's herbarium, and, more recently, it has been gathered by Dr. Wight, on the Madras coast, and by myself on the south coast of Ceylon. But none of the Indian specimens that I have seen approach in size and beauty to those found in Western Australia. The *cystocarpic* fruit is still a desideratum; the *stichidia* are very commonly found.

Fig. 1. DICTYMENIA FRAXINIFOLIA,—*the natural size*. 2. Section through the lamina. 3. Portion of the surface of the lamina, showing the serrated margin, and the *stichidia* rising from the nerves. 4. A stichidium. 5. A tetraspore:—the latter figures variously *magnified*.

Plate CIII

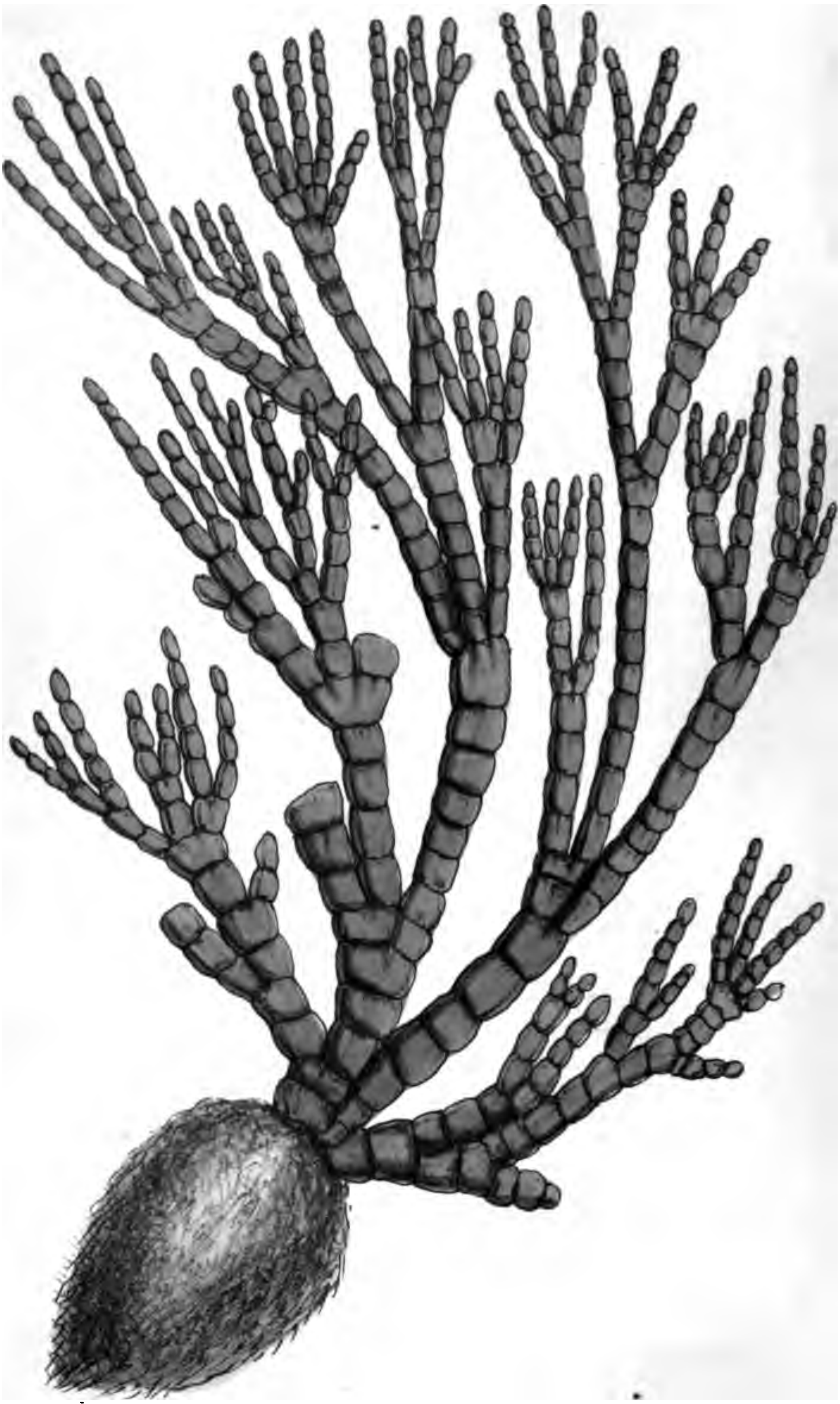


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PLATE CXXV.

HALIMEDA INCRASSATA, *Lamx.*

GEN. CHAR. *Roots* fibrous, much branched. *Frond* dendroid, articulato-constricted, with flattened internodes (or *articulations*), coated with a calcareous crust, and composed internally of a plexus of longitudinal, subparallel, unicellular, branching filaments.—HALIMEDA (*Lamour.*), from one of the *Nereids.*

Radix fibrosa, ramosissima. Frons dendroidea, articulato-constricta, internodiis (articulisve) planiusculis, crustâ calcareâ corticata, intus e filis longitudinalibus subparallelis intertextis unicellularibus ramosis composita.

HALIMEDA *incrassata;* frond subsolitary, erect, flabelliform, distichously much branched; articulations thickened, the lowest compresso-terete, quadrate; the medial cuneate; the upper compressed, obscurely repando-crenate, or oblong and moniliform.

H. incrassata; ***fronde subsolitaria erecta flabelliformi distiche ramosissima, articulis incrassatis, inferioribus compresso-teretibus quadratis, mediis cuneatis oblongisve, superioribus nunc repando-crenatis nunc oblongis ad genicula moniliformiter constrictis.***

HALIMEDA incrassata, *Lamx. Exp. Meth. p.* 25; *Polyp. p.* 307. *Kütz. Sp. Alg. p.* 504. *Harv. Ner. Bor. Amer. pars* 3. *p.* 24.

HALIMEDA monilis, *Lamx. l.c. Kütz. Sp. p.* 505.

FLABELLARIA incrassata, *Lamarck, An. Mus. v.* 20. *p.* 302.

CORALLINA incrassata, *Ellis et Sol. p.* 111. t. 20 *d.*

CORALLINA monilis, *Ellis et Sol. p.* 110. *t.* 20 *C.*

HAB. On (dead) coral reefs. Albany Island, tropical Australia. *Dr. Ferd. Müller.*

GEOGR. DISTR. Common on the coral reefs of the tropical Pacific. West Indies. Keys of Florida.

DESCR. *Root,* a compact, intricately interwoven mass of slender, branching fibres, as large as a pigeon's egg, or larger. *Frond* solitary, or two or three from the same base, 4–8 inches high, flabelliform in outline, fastigiate, subtrichotomously branched or polychotomous, all the branches and their divisions erect, gradually attenuated towards the extremities. *Articulations* very thick, quadrate or oblong, or the medial obscurely cuneate, the lowest most terete, the upper more compressed; the lowest 3–4 lines in breadth, the upper 1–2 lines, the very uppermost scarcely a line broad. The uppermost ramuli are sometimes bead-shaped, with much contracted nodes; sometimes flattened, and a little separate. *Colour,* when growing, a yellowish-green,

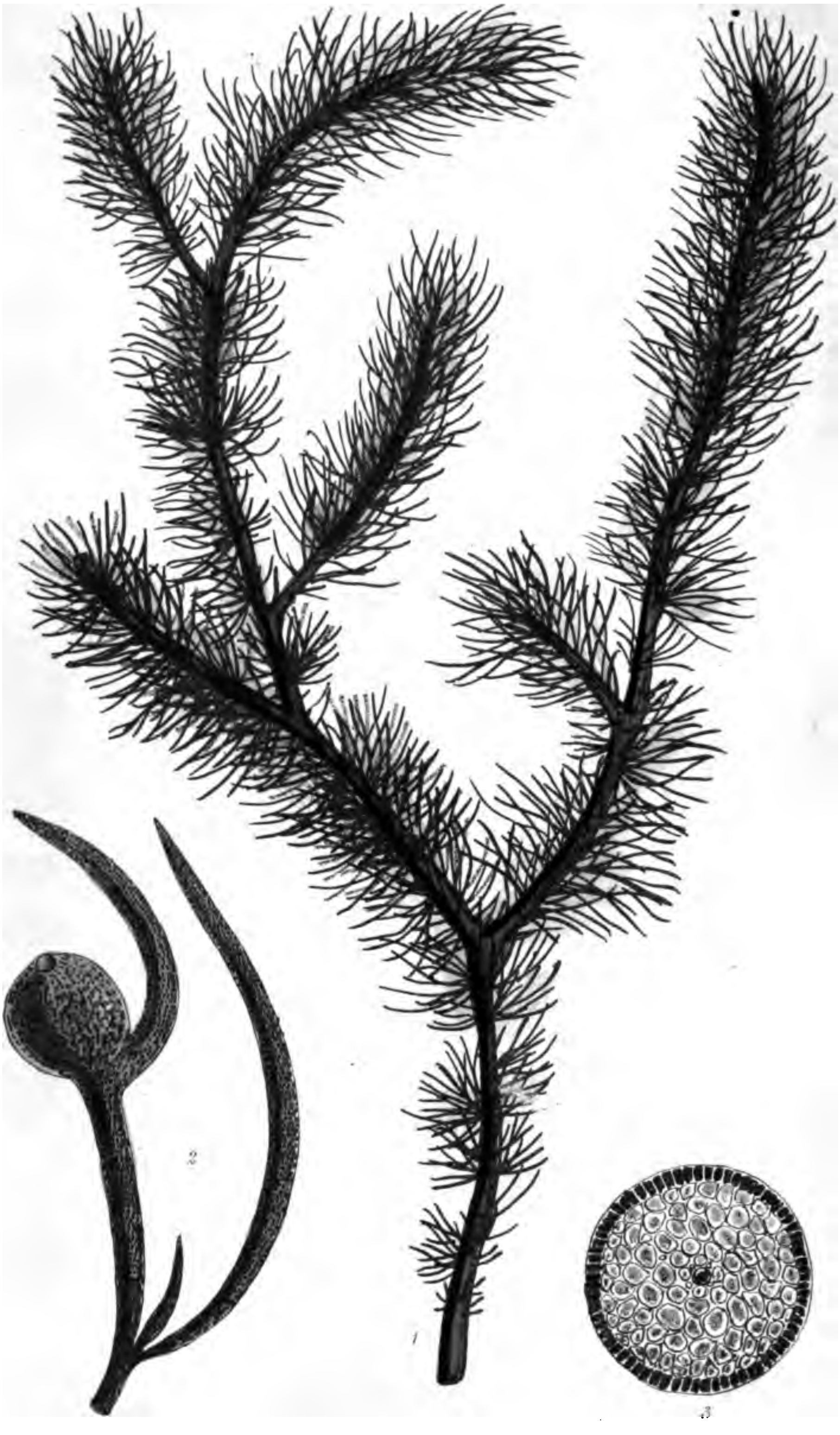
becoming pale in the herbarium, and chalky-white if exposed to the elements. *Substance* stony, calcareous; the tissues containing much lime.

Specimens of this species were collected by Dr. Mueller during Mr. Gregory's expedition to North Australia; but our figure is drawn from one gathered by myself at the Friendly Islands in the Pacific. It is a characteristic and common plant on coral rocks within the tropics of both hemispheres, growing on the upper surface of the reef, where the coral is dead and covered with sand and debris. The matted roots sink deep in the sand, and take a firm grip on the indurated matter below.

A second species of *Halimeda* (*H. macroloba*, Dcne.) occurs in Western Australia; and no doubt *H. Opuntia* will yet be found on the northern or north-western coast. *H. incrassata* is readily known from both these by its thicker substance, and much narrower articulations; the ends of the branches often extending like fingers or toes.

Fig. 1. HALIMEDA INCRASSATA,—*the natural size.*

Plate CXIV



Vincent Brooks Imp

PLATE CXXVI.

RHODOMELA TRIGENEA, *Harv.*

GEN. CHAR. *Frond* terete, dendroid, inarticulate, solid, coated with minute polygonal cellules; the axis articulated, polysiphonous. *Fructification:* 1, ovate *ceramidia* containing a tuft of pear-shaped spores; 2, *tetraspores* lodged in swollen ramuli or in pod-like stichidia, in a single or double row.—RHODOMELA (*Ag.*), from ῥοδεος, *red,* and μελας, *black;* because these plants become darker in drying.

Frons teres, dendroidea, inarticulata, solida, cellulis minutis polygonis corticata; axi articulato polysiphonio. Fruct.: 1, ceramidia ovata, sporas pedicellatas fasciculatas pyriformes foventia; 2, tetrasporæ triangule divisæ, in ramulis immersæ v. in stichidiis propriis evolutæ.

RHODOMELA *Trigenea;* frond tall, very thick and rigid, slightly branched, branches subsimple, densely beset on all sides with short, setaceous, acute, subsimple, rigid, fascicled, patent ramuli; ceramidia globose, sessile on the sides of the ramuli.

R. Trigenea; *fronde elata crassissima rigida parcissime ramosa, ramis simpliciusculis undique densissime ramulis obsessis, ramulis quaquaversum egredientibus brevibus setaceis acutis simplicibus v. vix ramosis rigidis fasciculatis patentibus, ceramidiis globosis ad ramulorum latera sessilibus.*

TRIGENEA australis, *Sond. in Bot. Zeit.* 1845, *p.* 54. *Pl. Preiss. v.* 2. *p.* 181. *Harv. Ner. Austr. p.* 37. *Kütz. Sp. Alg. p.* 841. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 538.

RHODOMELA vestita, *Harv. MSS. in Herb.* (1838).

HAB. Cast ashore. Fremantle, *Backhouse, Preiss, G. Clifton, W. H. H.,* South Australia, *Dr. Curdie.* Port Phillip Heads, *Dr. F. Müller.*

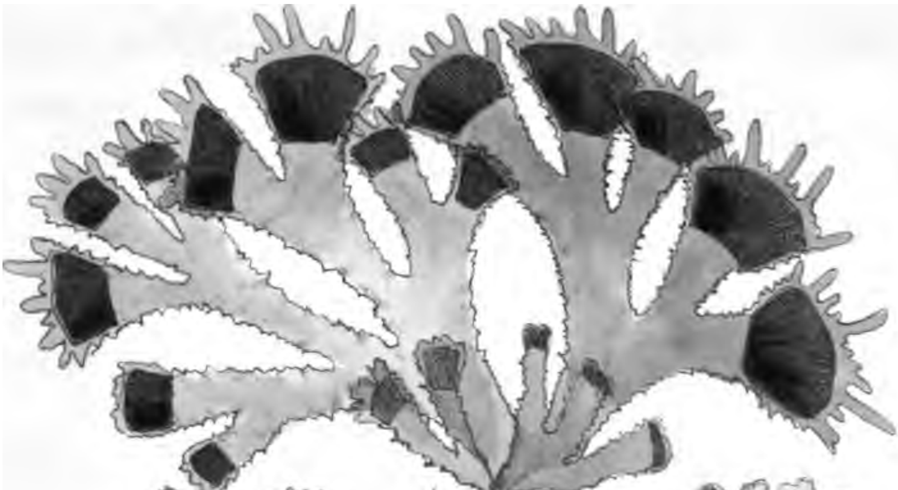
GEOGR. DISTR. West and south coasts of Australia.

DESCR. *Root?* *Frond* 12–16 inches long, 1½–2 lines in diameter, very opaque, dividing irregularly into 3–4 branches, or simply forked, with wide rounded axils. *Branches* 6–8 inches long, flexuous or incurved, simple or emitting one or more shorter, lateral, secondary branches, densely clothed throughout with short, subsimple, fascicled ramuli. *Ramuli* 6–8 lines long, setaceous, spreading to all sides, horizontally patent or squarrose, simple or with one or two lateral branchlets, or forking, quite opaque, with minute surface-cellules, acute, tapering at base. *Ceramidia* globose, sessile on the sides of the ramuli, a short distance below the apex, which is then incurved, and forms a sort of bract to the ceramidium. *Colour* a dark, full red, becoming brownish in drying. *Substance* very rigid, horny when dry, in which state the plant does not adhere to paper.

* * *

My first acquaintance with this plant was from a specimen given me in 1838 by Mr. James Backhouse, and I then placed it, unhesitatingly, in the genus *Rhodomela;* but did not publish it with a name. Afterwards, in 1845, Sonder described it, from Preiss's specimens, under the name *Trigenea australis,* which name I adopted in the 'Nereis.' Lastly, in 1854, having collected personally, and received from Mr. Clifton, Dr. Curdie, and Dr. Mueller, more perfect specimens, I return to my earlier opinion, and replace it among the *Rhodomelæ,* retaining Sonder's name "*Trigenea*" for the species. So far as the fructification is known, it agrees with *Rhodomela,* and there is nothing in structure or habit which compels us to put it in a different genus. The multiplication of generic groups which have no strongly marked limits, is one of the banes of modern botany.

Fig 1. RHODOMELA TRIGENEA,—*the natural size*. 2. A ramulus, with *ceramidium*. 3. Cross section of the ramulus:—the latter figures variously *magnified.*



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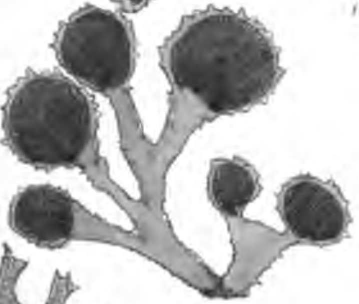

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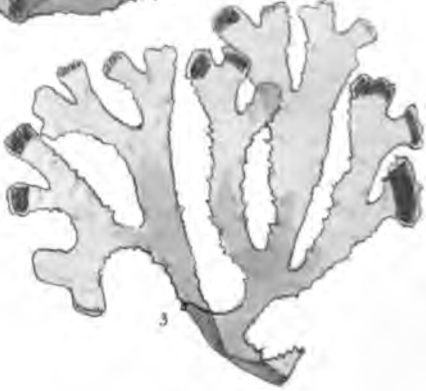

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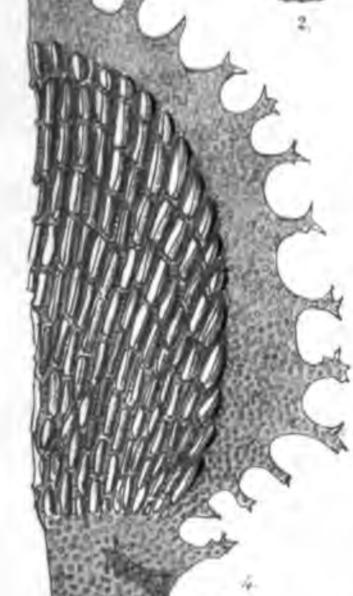

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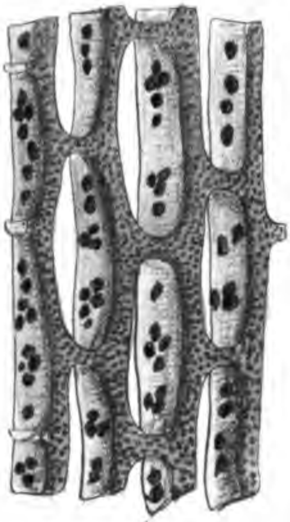

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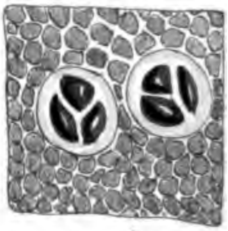

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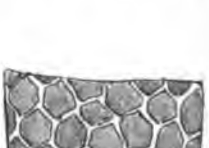

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PLATE CXXVII.

MARTENSIA DENTICULATA, *Harv.*

GEN. CHAR. *Frond* substipitate or sessile, membranous, nerveless, fringed (at maturity) with an open network, formed of vertical and horizontal anastomosing bars and cross-bars. *Fructification:* 1, *ceramidia*, containing, within a membranous pericarp, a dense tuft of pear-shaped spores; 2, *tetraspores*, usually lodged in the cross-bars of the network.—MARTENSIA (*Hering*), in honour of Professor Martens, of Brussels.

Frons substipitata v. sessilis, membranacea, enervis, areolata, infra marginem (in ætate majore) clathrato-fenestrata; reticulo ex trabeculis verticalibus et horizontalibus formato. Fruct.:* 1, *ceramidia;* 2, *tetrasporæ triangule divisæ, in laminis verticalibus reticuli immersæ.

MARTENSIA *denticulata;* fronds sessile, tufted, delicately membranaceous, repeatedly dichotomous; segments cuneate, the uppermost very often flabelliform; margin curled and denticulate; upper margin of the network ciliate, dentate or lobulate, the lobules at length elongate and fenestrate.

M. denticulata; ***frondibus sessilibus cæspitosis tenuissime membranaceis repetite dichotomis, laciniis cuneatis ultimis non raro flabelliformibus, margine crispato denticulato, reticulo apice ciliato, denticulato v. lobato, lobulis demum elongatis fenestratisque.***

MARTENSIA denticulata, ***Harv. in Trans. R. I. Acad. v.* 22. *p.* 537. *Harv. Alg. Austr. Exsic. n.* 112.**

HAB. On rocks and Algæ, at extreme low-water mark, Garden Island, Rottnest Island, Fremantle; frequently cast ashore in winter, ***W. H. H. G. Clifton.***

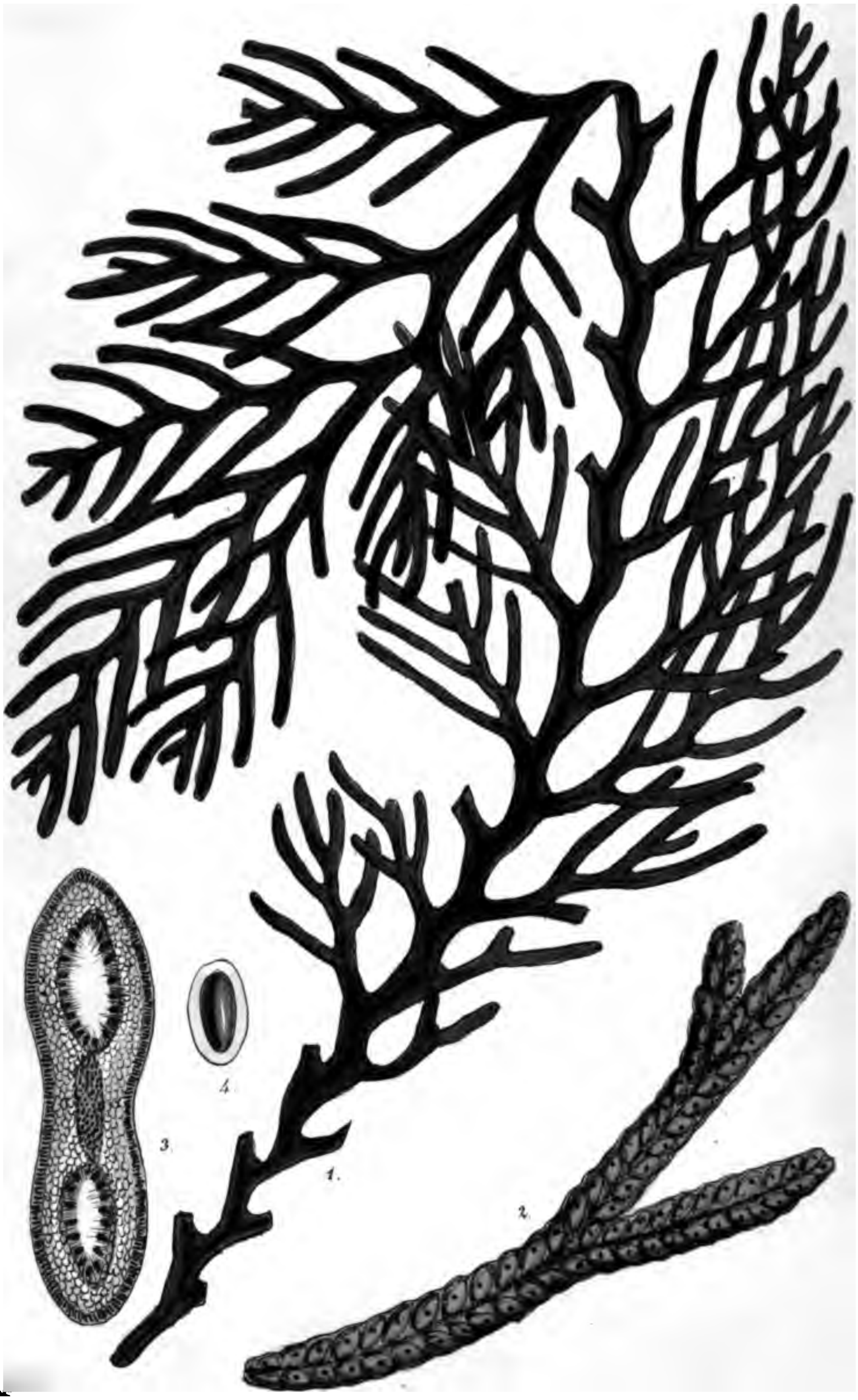
GEOGR. DISTR. Western Australia.

DESCR. *Root* discoid. *Fronds* densely tufted, quite sessile, 2–3 inches long, as much in expansion, repeatedly forked, with rounded but narrow axils, fastigiate; the segments linear-cuneate, the uppermost often obovate or orbicular. *Margin* wavy, irregularly but sharply denticulate, rarely subentire or remotely toothed. *Network* gradually formed at the end of the branches, finally extending about ½ or ⅔ down their length, composed of very slender vertical and horizontal bars; the uppermost margin toothed or ciliate; the teeth, in old specimens, frequently lengthen into small linear lobes, which sometimes bear secondary networks at their apices. The ramification of the frond is very variable, and so is the proportion of the divisions to each other. *Ceramidia* (very rare) sessile on the network, ovate-urceolate, with a prominent orifice. *Tetraspores* abundantly formed on the bars of the network, spherical, ternately parted. *Colour* variable according to the age or freshness of the specimen; when quite fresh it is greenish-purple, reflecting iridescent tints; on exposure, or in fresh-water, it rapidly assumes a brighter red, and sometimes becomes rosy or blood-red. *Substance* very delicate, soon decomposing in fresh-water. In drying the frond closely adheres to paper.

This delicately-beautiful Alga is by no means rare at Rottnest Island, after winter gales, being cast up on most of the sandy beaches to the west of the pilot's house. It grows on rocks, just below low-water mark, at the little cove called "Bagdad," and elsewhere.

As a species, it is readily known from the other Australian kinds by its toothed or ciliate margin, and by the dark, often livid colour, when fresh. It is also of thinner substance, and more densely tufted than the others. Indeed, it is much more nearly allied to the Ceylon *M. fragilis* than to the Australian species, and perhaps it may not always be clearly distinguishable from that plant. Generally the margin and colour define it, but specimens sometimes occur in which the toothing is obsolete and the colour bright. I have not seen it forming globular tufts, as *M. fragilis* does; but such a character is hardly specific, and the external form is so varied in different specimens from the same beach, that it gives us little aid.

Fig. 1, 2, 3, different varieties of MARTENSIA DENTICULATA,—*the natural size*. 4. Portion of the lamina, showing the toothed margin, and part of a network. 5. Small portions of a network, bearing *tetraspores* on the longitudinal bars. 6. Tetraspores *in situ*. 7. Surface-cells from the basal portion of the frond:—the latter figures *variously magnified*.



Vincent Brooks, Imp.

PLATE CXXVIII.

CARPOGLOSSUM ANGUSTIFOLIUM, *J. Ag.*

GEN. CHAR. *Root* discoid. *Frond* with subdistinct stem and leaves; pinnate; leaves vertically flattened, imperfectly costate. *Vesicles* and *receptacles* none. *Spore-cavities* scattered over both surfaces of the leaves, hemispherically prominent, monœcious. *Paranemata* simple.—CARPOGLOSSUM (*Kütz.*), from *καρπος, fruit,* and *γλωσσα, a tongue;* because the fruit-bearing leaves are tongue-shaped.

Radix scutata. Frons caule a foliis subdistincto heterogenea, pinnatim decomposita; phyllodiis verticaliter applanatis, immerse costatis. Receptacula propria et vesiculæ nullæ. Scaphidia in utraque pagina foliorum sparsa, hemisphærice prominentia, monoica. Sporæ obovoideæ, subsessiles. Paranemata simpliciuscula.

CARPOGLOSSUM *angustifolium;* frond laxly pinnated; stem two-edged, broader than the patent pinnatifid phyllodia; pinnules linear, very entire, obtuse; spore-cavities in a double row.

C. angustifolium; *fronde laxiuscule pinnata; caule ancipiti, phyllodiis patentibus pinnatifidis latiore; laciniis linearibus integerrimis obtusis, scaphidiis biseriatis.*

CARPOGLOSSUM angustifolium, *J. Ag. Sp. Alg. v.* 1. *p.* 194. *Harv. Alg. Austr. Exsic. n.* 39. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 534.

PLATYTHALIA angustifolia, *Sond. Bot. Zeit.* 1845. *p.* 51. *Alg. Preiss, v.* 2. *p.* 158.

MYRIODESMA angustifolium, *Kütz. Sp. Alg. p.* 588.

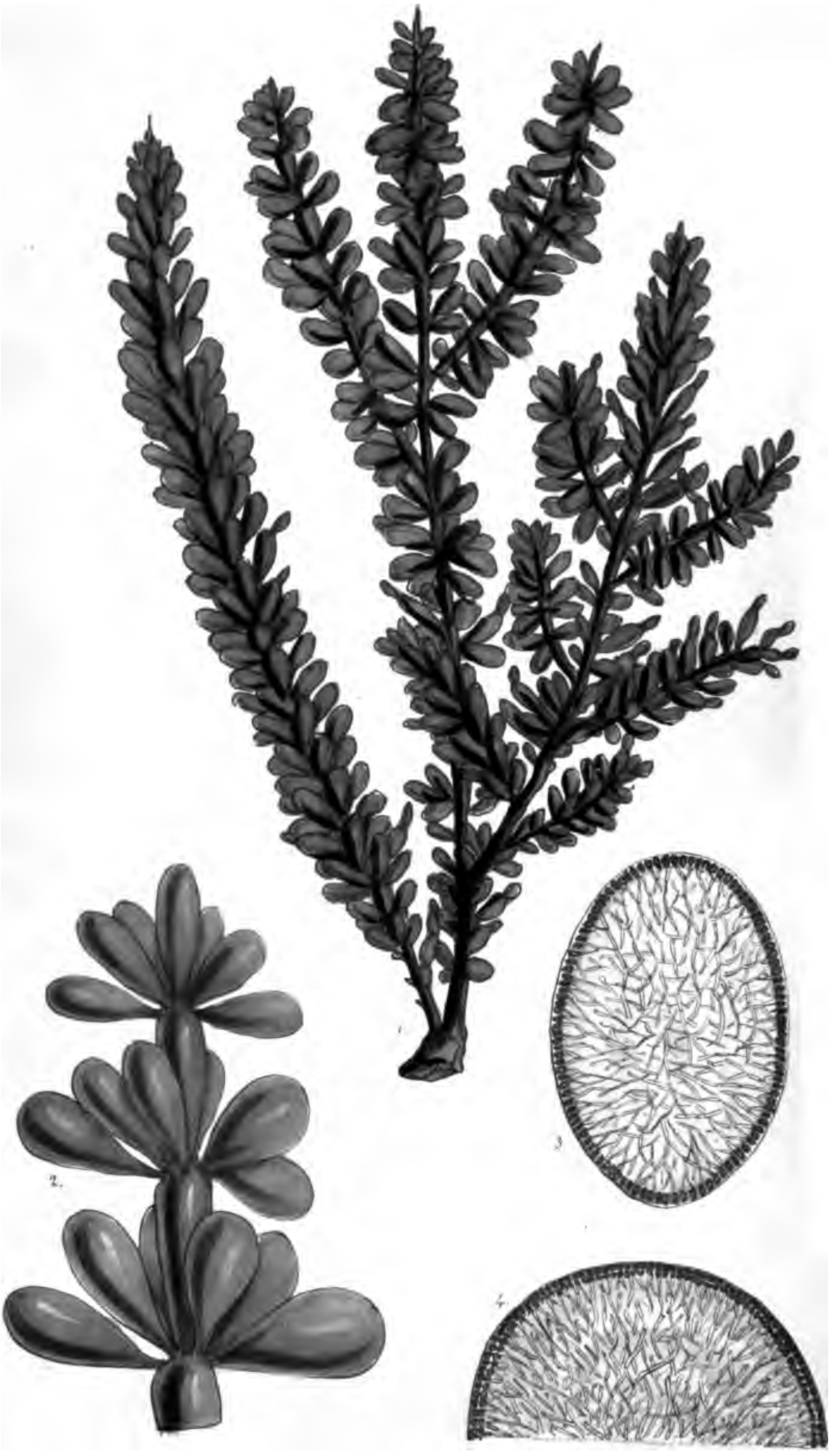
HAB. Western Australia, *Preiss, Mylne.* At Cape Riche, *W.H.H.*

GEOGR. DISTR. Western and south-western coasts of Australia.

DESCR. *Root* a bulbous mass, emitting stout fibres. *Stems* many from the same base, 2–3 feet long, 2–2½ lines wide, nearly equally broad throughout, two-edged or flat, with a thickening or rib in the middle, slightly zigzag, naked below for several inches, or a foot or more above the base, thence to the summit regularly pinnate or bipinnate; the general outline lanceolate or ovato-lanceolate. *Pinnæ* alternate, issuing from the sharp edge of the stem, erecto-patent, ½–1½ inch apart, deeply pinnatifid or bipinnatifid, with linear, entire laciniæ, 1–1½ line wide, 1–1½ inch long, very obtuse. *Receptacles* formed from the laciniæ or pinnules, not much altered or swollen, but pierced with a double row of pores, under which are placed the spore-cavities. *Spores* elliptical. *Colour* a deep brownish-olive, becoming black in the herbarium. *Substance* coriaceous when fresh, brittle when dry. It does not adhere to paper in drying.

This fucoid, so far as known, is limited to Western Australia, but found from one end of the colony to the other. A glance at the figure is sufficient to show how readily it may be known from *C. quercifolium* (Plate XLIII.), the only other West Australian species; and it is still less like *C. confluens*, the East Australian species. As already noticed under Plate XLIII., the genus *Carpoglossum* is scarcely distinct, on the one side from *Myriodesma*, and on the other from *Fucodium;* or indeed from *Fucus.*

Fig. 1. CARPOGLOSSUM ANGUSTIFOLIUM,—*the natural size.* 2. A receptacle, or fertile pinnule. 3. Cross section, showing two *spore-cavities* (*scaphidia*), and spores *in situ.* 4. A spore:—the latter figures variously *magnified.*



Vincent Brooks, Imp.

PLATE CXXIX.

RHABDONIA? GLOBIFERA, *J. Ag.*

GEN. CHAR. *Frond* filiform, decompound, imperfectly tubular; tube partly filled with longitudinal, branching and anastomosing filaments; peripheric stratum composed of polygonal cellules, smaller toward the circumference. *Fructification:* 1, *conceptacles* immersed in the branches, suspended among the axial filaments, and enclosed in a network of filaments, containing moniliform strings of spores, radiating from a central placenta; 2, zonate *tetraspores* dispersed through the superficial stratum.—RHABDONIA (*Harv.*), from ῥαβδος, *a twig;* in allusion to the twiggy ramification of the species.

Frons filiformis, decomposite ramosa, tubulosa; tubo filis longitudinalibus ramosis anastomosantibus percurso; strato peripherico ex cellulis angulatis superficiem versus minoribus contexto. Fruct.: 1, *cystocarpia infra stratum periphericum suspensa, reticulo filorum velata, carpostomio demum aperta, fila sporifera moniliformia a placenta centrali emissa continentia;* 2, *tetrasporæ zonatim divisæ, per ramos minores sparsæ, immersæ.*

RHABDONIA *globifera;* frond terete, sparingly branched; branches virgate, densely beset on all sides with obovate, saccate ramuli.

R. globifera; *fronde terete crassiuscula simpliciuscula vel parce ramosa; ramis virgatis ramulis obovatis saccatis undique densissime obsessis.*

RHABDONIA? globifera, *J. Ag. Sp. Alg. v.* 2. *p.* 355? (*excl. syn. plur.*).

FUCUS globiferus, *Lamour. in Herb. Paris.?*, *fide J. Ag. l. c.*

HAB. Coasts of New Holland, *Herb. Paris.* Near Fremantle, Western Australia, *G. Clifton.*

GEOGR. DISTR. West coast of Australia.

DESCR. *Root* a bulbous tubercle. *Stems* two or more from the same base, 6 inches high, ½ a line in diameter, simple or alternately or vaguely branched; the branches erecto-patent, quite simple, virgate, the younger parts constricted at the nodes. Both stem and branches are densely beset on all sides with subhorizontal, imperfectly whorled, obovate, saccate, very obtuse ramuli, 2–3 lines long, and nearly 1 line in diameter. These *ramuli* are membranous, and filled with more or less densely interwoven, anastomosing, longitudinal filaments; the membrane consists of a single row of quadrate or oblong, coloured cells. The stem has a similar structure, but more dense, and its periphery is formed of two or more rows of cells. The *fruit* is unknown. The *colour* is a very dark brownish-red, turning darker in drying. The *substance* is rigid, and the plant scarcely adheres to paper in drying.

Under Plate X. of Vol. I. (*Chrysymenia obovata*), I have quoted, from Professor J. Agardh, several synonyms, two of which I now wish to transfer to the present Alga, which I suppose may be the *true* "*Rhabdonia globifera*" of Agardh. It has externally a habit strikingly like some of the smaller and denser specimens of *Ch. obovata,* but its cellular structure is widely different; and in this latter character it seems to agree with the plant described by Agardh from the Paris Herbarium. Whether that be the plant figured by Lamouroux under the name "*Gigartina ovata,*" is uncertain; his figure will serve for either plant, and, of the two, bears a greater resemblance to Sonder's *Chrysymenia obovata* than to the subject of the present Plate. Thus much is certain: there are at least *two* plants confounded under *Rhabdonia globifera* of Agardh. One of them is *Chrys. obovata,* Sond.! (our Plate X.); the other *may* be what is here figured, or if not, *must* be a closely allied species of similar structure and habit.

My figure is drawn from a single specimen sent to me by Mr. Clifton, and preserved in the Dublin University Herbarium. It seems to be of very rare occurrence, whereas *Ch. obovata* is a very common plant both in Western Australia and along the south coast as far as Bass's Straits.

The *habit* of *R. globifera* is peculiar in the genus *Rhabdonia,* and in this respect it agrees better with *Erythroclonium,* but it wants the central axile filament characteristic of that genus. It may perhaps be a matter for future decision whether the genera *Areschougia, Rhabdonia,* and *Erythroclonium,* ought not to be united under a common name and character. *Areschougia sedoides* (Plate CXVII.) and the present plant bring the three groups almost together.

Fig. 1. RHABDONIA? GLOBIFERA,—*the natural size.* 2. End of a young branch with whorled ramuli. 3. Cross section of a ramulus. 4. Semi-section across the stem:—the latter figures variously *magnified.*

Plate

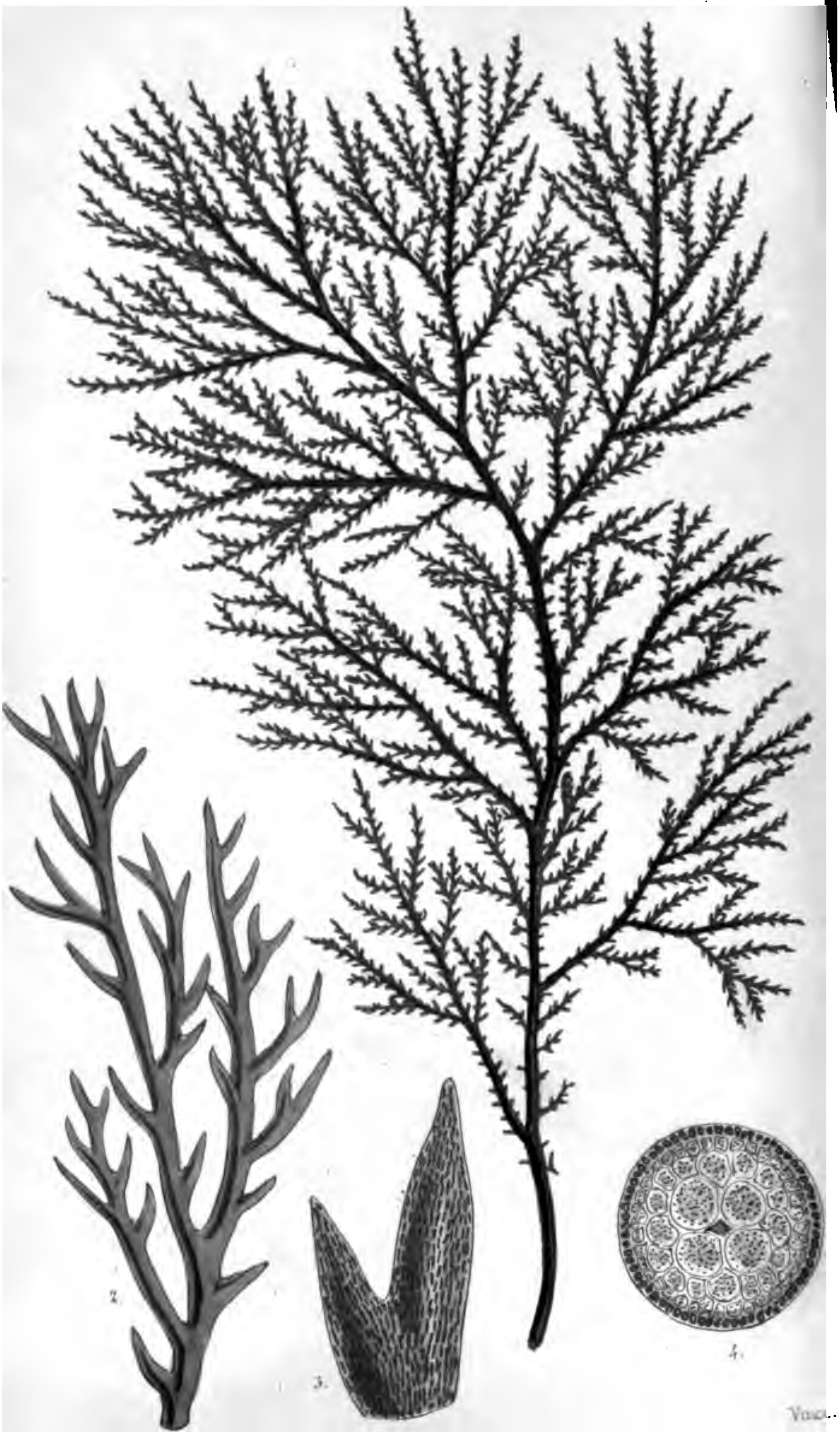


PLATE CXXX.

RHODOMELA? SPINULOSA, *Harv.*

GEN. CHAR. *Frond* terete, dendroid, inarticulate, solid, coated with minute polygonal cellules; the axis articulated, polysiphonous. *Fructification:* 1, ovate *ceramidia* containing a tuft of pear-shaped spores; 2, *tetraspores* lodged in swollen ramuli or in pod-like stichidia, in a single or double row.—RHODOMELA (*Ag.*), from ῥοδεος, *red,* and μελας, *black;* because these plants become darker in drying.

Frons teres, dendroidea, inarticulata, solida, cellulis minutis polygonis corticata; axi articulato, polysiphonio. Fruct.: 1, *ceramidia ovata, sporas pedicellatas fasciculatas pyriformes foventia;* 2, *tetrasporæ triangule divisæ, in ramulis immersæ v. in stichidiis propriis evolutæ.*

RHODOMELA *spinulosa;* frond robust, dendroid, decompoundly much-branched; branches and ramuli erecto-patent, spreading to all sides, vaguely divided; ramuli short, spine-like, scattered; ceramidia terminal.

R. spinulosa; *fronde crassa dendroidea decomposite ramosissima; ramis ramulisque erecto-patentibus quoquoversum sistentibus vage divisis; ramulis brevibus spinæformibus sparsis; ceramidiis ramulos terminantibus.*

ALSIDIUM? spinulosum, *Harv. Alg. Austr. Exsic. n.* 138.

HAB. Cast ashore from deep water. Garden and Rottnest Islands, near Fremantle, and on the shore at Cape Riche, *W. H. H.*

GEOGR. DISTR. Western and south-western coasts of Australia.

DESCR. *Root? Frond* 10–12 inches long, very much branched, and bushy, tree-like, with a robust, deliquescent stem, nearly a line in diameter at base, gradually tapering upwards, and breaking up above into many slender branches. The ramification is very irregular, in no part pinnate or dichotomous, and more inclining to a subspiral, alternate division than to any other. The *branches* spring from all sides of the stem, and are directed every way; they are 3–4 times decompound, and set at short intervals with spine-like ramuli. *Ramuli* 1–2 lines long, erecto-patent, subulate, acute, quite simple. *Conceptacles* rare, ovate, terminating the ramuli. *Stichidia* unknown. Every part of the plant, when examined under the microscope, is opaque and coated with small, oblong cellules; but in the dried frond, viewed under a pocket-lens, there is a faint appearance of transverse striæ in the younger branches and ramuli. A transverse section shows four large tubes surrounding the axile cell, and filled with dispersed granules; and a coating of

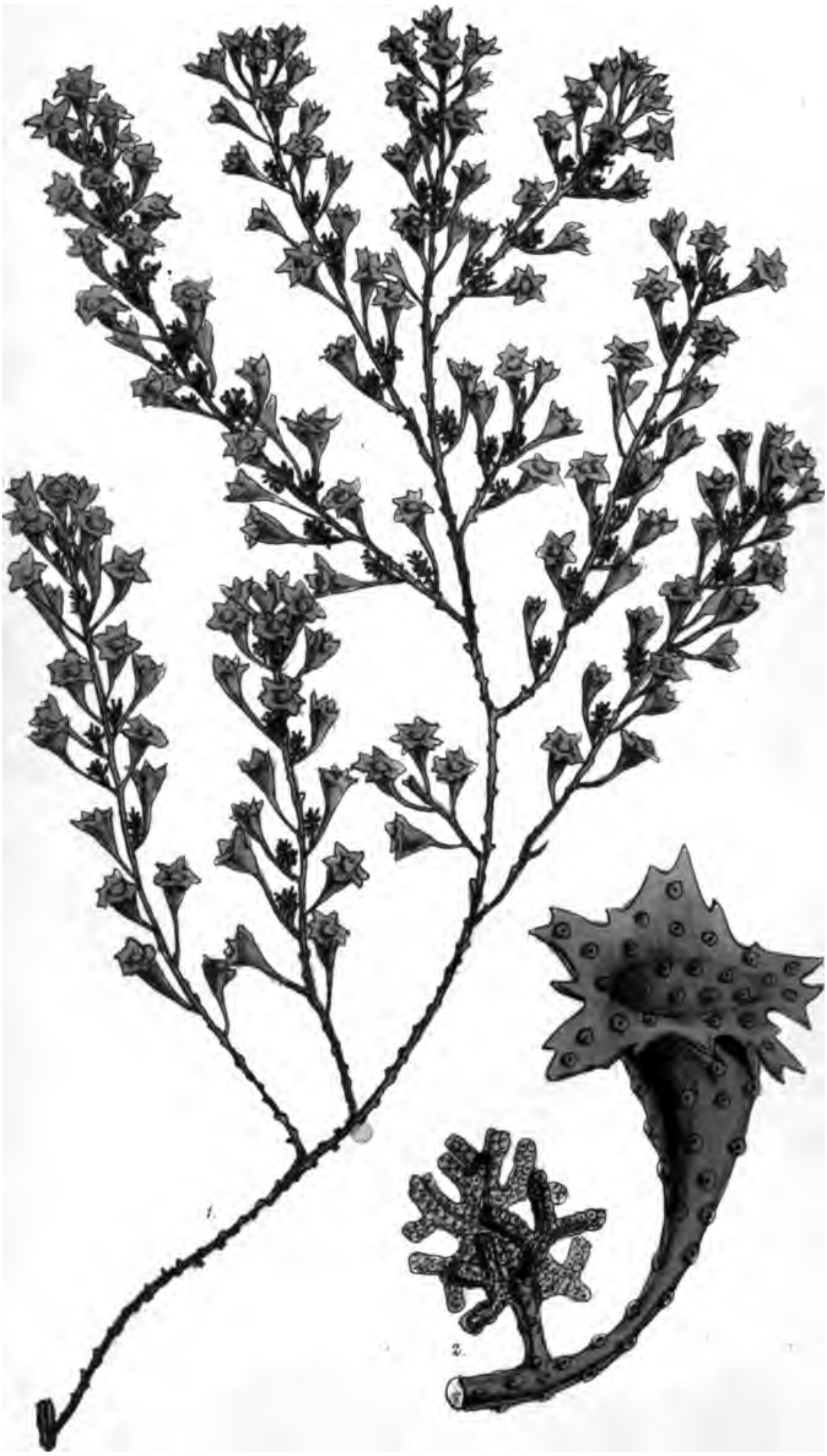
similar but smaller cells of variable thickness surrounds these, and connects them with the coloured, peripheric cellules. The *colour*, when fresh, is a dull brownish-red; becoming much darker and browner in drying. The *substance* is rigid, and the frond adheres very imperfectly to paper in drying.

* * *

A coarse-growing, rigid plant, very subject to be overgrown by parasites, and especially by a crustaceous species of *Melobesia*, which sometimes invests every twig and ramulus in a calcareous sheath. I formerly placed it in *Alsidium*, judging more by external marks than by any positive character; but on reconsideration there seems no valid reason (the fruit being unknown) why it should not be placed in *Rhodomela*, with which the habit and structure sufficiently agree. The peculiarly short, subulate ramuli, and an imperfectly seen transverse striolation, had formerly induced me to refer it to *Alsidium*. The genus to which it truly belongs cannot positively be known till its tetrasporic fruit shall be found.

It is not uncommon in Western Australia.

Fig. 1. RHODOMELA? SPINULOSA,—*the natural size*. 2. A small branch,—slightly *magnified*. 3. Ramuli from the same. 4. Transverse section of branch:—more highly *magnified*.



Vincent Brooks, Imp.

PLATE CXXXI.

TURBINARIA GRACILIS, *Sond.*

GEN. CHAR. *Root* branching. *Frond* alternately decompound, with distinct stem, vesicles, and receptacles; the leaves confluent with the vesicles. *Leaf-vesicles* stipitate, turbinate, crowned with a peltate lamina. *Receptacles* pod-like, toruloso-verrucose, dichotomously branched, axillary. *Scaphidia* diœcious? *Spores* obovoid.—TURBINARIA (*Lamour.*), from *turbo*, 'a top;' from the top-shaped vesicles.

Radix ramosa. Frons alterne decomposita, caule proprio, ramis, vesiculis receptaculisque donata; foliis cum vesiculis confluentibus. Folia vesiculata stipitata, turbinata, laminâ peltatâ horizontali apice coronata. Receptacula siliquæformia, toruloso-verrucosa, dichotome ramosa, axillaria. Scaphidia dioica? Sporæ obovoideæ.

TURBINARIA *gracilis*; branches slender, reflexed at their insertion; vesicles obconical or subglobose, obtuse at the apex, crowned with a wide, irregularly toothed lamina; receptacles much branched.

T. gracilis; *ramis gracilibus retroflexis; foliis vesiculosis obconicis sphæricisque apice obtuso membrana lata vage dentata coronatis; receptaculis axillaribus ramosis.*

TURBINARIA gracilis, *Sond. in Bot. Zeit.* 1845, *p.* 52. *Pl. Preiss. v.* 2. *p.* 165. *J. Ag. Sp. Alg. v.* 1. *p.* 268.

HAB. Western Australia, *Preiss, Mylne.*

GEOGR. DISTR. Western Australia.

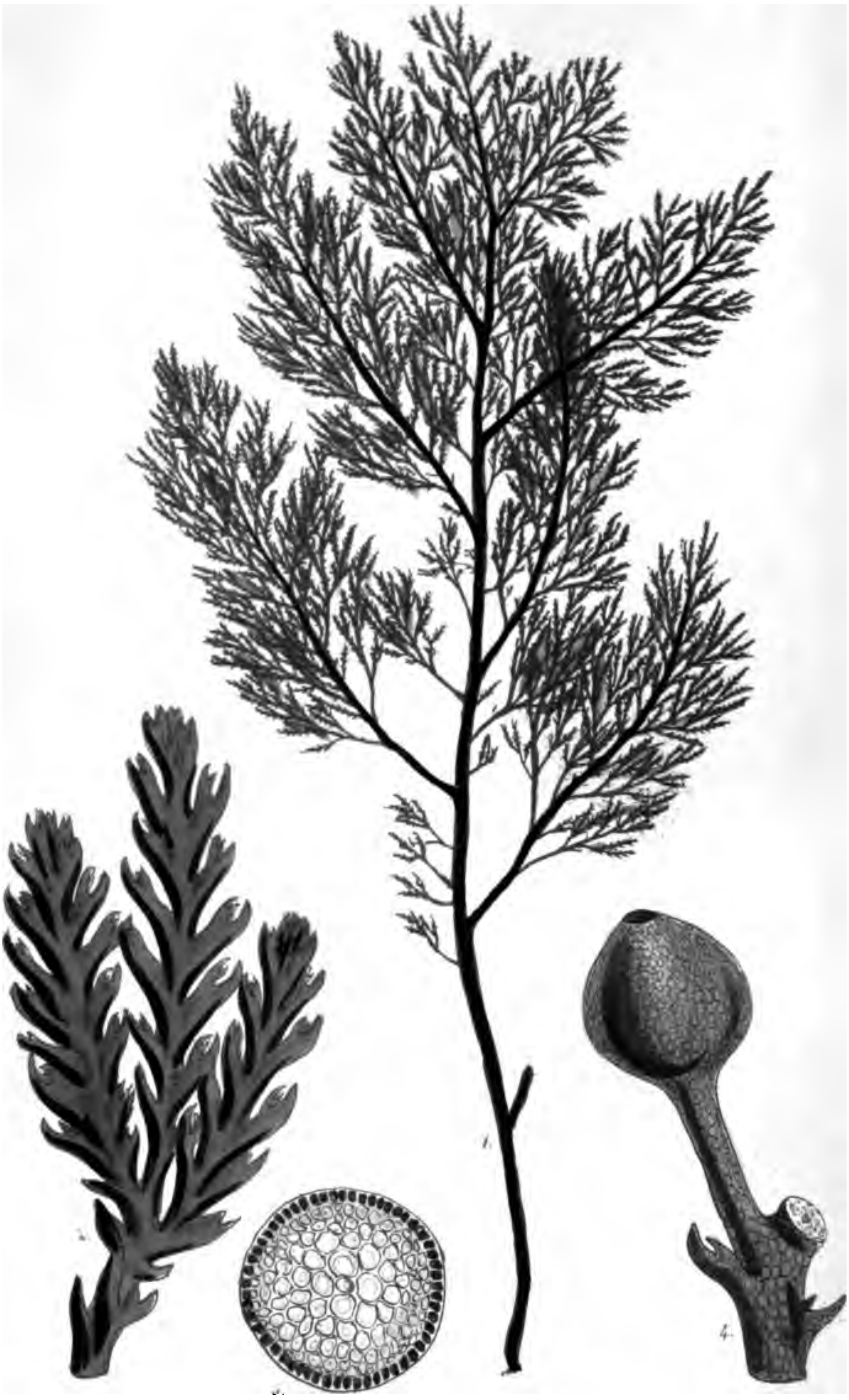
DESCR. *Root* and *stem* not known. *Branches* 12–18 inches long, slender, terete, rough with remains of broken ramuli, and furnished in the upper half with several lesser branches, or ramuli. *Ramuli* 3–5 inches long, retroflexed at their insertion, patent, simple, set throughout with leaf-vesicles in alternately spiral order. *Vesicles* on pedicels 2–3 lines long, obconical or swollen, and then subspherical, covered with prominent glands, and crowned round the naked summit with a broadish, more or less toothed or laciniate, peltate lamina. *Receptacles* springing from the stipes of the vesicle, a short way from the axil, much branched; the branches spreading, forked, obtuse, torulose. *Colour* olivaceous when recent, turning very dark when dry. *Substance* coriaceous, rather brittle when dry. It does not adhere to paper.

Whether this be a true species, or merely an attenuated form of the *T. vulgaris*, is a point which I leave undecided. The retroflexed insertion of the branches, noticed by Sonder, is not more striking in this plant than in large, deep-water specimens of *T. vulgaris.* Indeed, except in the slenderness of all parts, and in the sub-distant and laxly inserted leaf-vesicles, I find no absolute distinctive characters.

The *T. vulgaris* has not yet been recorded as Australian, but it probably will be found on the northern or north-western coasts, or on the great coral reefs of the north-east. Our *T. gracilis* seems to be very rare. I am indebted to Herr Binder, Bürgermeister of Hamburg, for the specimen here figured, which is larger and in better condition than earlier specimens given to me by Dr. Lemann. Mr. Clifton has not as yet sent this plant.

Fig. 1. TURBINARIA GRACILIS,—*the natural size.* 2. One of the leaf-vesicles, bearing a tuft of fruit, on its pedicel:—*magnified.*

Plate CXXII.



Vincent Brooks Imp

PLATE CXXXII.

ACANTHOPHORA ARBOREA, *Harv.*

GEN. CHAR. *Frond* filiform, cartilaginous, irregularly decompound, opaque, coated with small, polygonal, irregularly placed cellules; *axis* articulated, polysiphonous. *Ramuli* short, spine-like, acute, inserted on all sides. *Fructification:* 1, urceolate *ceramidia,* containing within a cellular pericarp a tuft of pear-shaped spores; 2, tripartite *tetraspores,* lodged in globose, sessile *stichidia.*—ACANTHOPHORA (*Lamour.*), from *ακανθα, a thorn,* and *φορεω, to bear;* alluding to the spine-like ramuli.

Frons filiformis, cartilaginea, vage ramosa, opaca, cellulis minutis polygonis irregularibus corticata; axi polysiphonio. Ramuli spinæformes, acuti, undique inserta. Fruct.: 1, *ceramidia;* 2, *stichidia globosa, sessilia, tetrasporas triangule partitas foventia.*

ACANTHOPHORA *arborea;* frond tree-like, robust, decompoundly much branched; primary branches long, tapering upwards, laterally much branched; secondary branches short, dichotomo-multifid, the ramuli very short, spinulous; spines subulate, fasciculate, inserted on all sides and imbricating; ceramidia subterminal, pedunculate, ovate.

A. arborea; *fronde dendroidea incrassata decomposite ramosissima; ramis primariis elongatis versus apicem attenuatis lateraliter ramosissimis, ramis secundariis brevibus dichotomo-multifidis, ramulis brevissimis spinulosis, spinulis subulatis fasciculatis undique insertis imbricatis; ceramidiis subterminalibus pedunculatis ovatis.*

ACANTHOPHORA arborea, *Harv. in Fl. Tasm. v.* 2. *p.* 296.

ACANTHOPHORA Tasmanica, *Harv. Alg. Exsic. Austr. n.* 140, *non Sond.*

HAB. Rocks at low-water mark. In the Tamar, above Georgetown, on the shore under Mr. Lawrence's domain, *Rev. J. Fereday* and *W. H. H.*

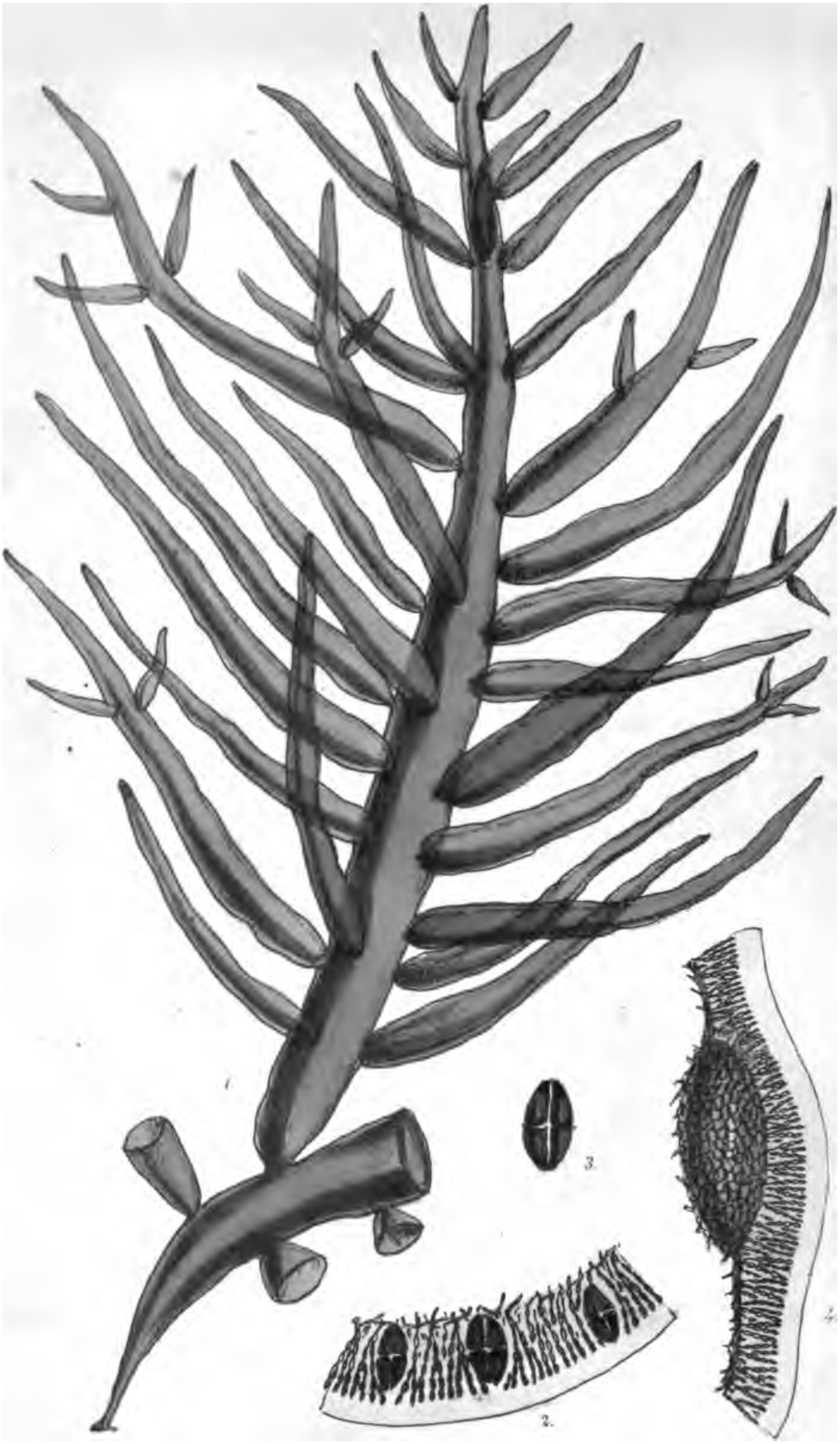
GEOGR. DISTR. Tasmania.

DESCR. *Root* discoid. *Fronds* 12–20 inches long, dendroid, excessively branched, the main stem cartilagineo-coriaceous, percurrent, nearly a line in diameter below, attenuated upwards. *Branches* 3–6 inches long, spreading to all sides, bushy, several times decompound, all the divisions alternate, erecto-patent, and inserted on all sides in an irregularly spiral order: the smaller divisions scarcely thicker than hog's-bristle. The spine-like ramuli are very minute and closely set, with 2–3 incurved, subfalcate teeth at the extremity. *Ceramidia* ovate, on long peduncles, or terminating short branchlets, densely cellular. The *frond* is perfectly opaque in all parts, and coated with small irregular cells; a transverse section shows four large cells surrounding the axile cell, and many rows of smaller exterior cellules, ending in the periphery formed of coloured cells. The *colour* of the frond when growing is a dark brownish- or purplish-red; when dry it is black. The *substance* is firm and tough, not very soft, and in drying the younger parts adhere closely, the older loosely, to paper.

The several so-called species of the genus *Acanthophora* do not rest on very certain or absolute characters, and in adding one to the number, perhaps I ought to make an apology. The present is still larger, more tree-like, and more densely ramuliferous than *A. dendroides*, its nearest ally; and is of a darker colour, and more rigid substance. It is quite different in habit from *A. Tasmanica*, Sond., for which I formerly mistook it; nor is there any other species of similar aspect. The microscopic characters, throughout this genus, are but too similar. Still there are appreciable differences in the spine-like ramuli, as well as in the general ramification.

Fig. 1. ACANTHOPHORA ARBOREA,—*the natural size.* 2. Small portion of the frond, showing the form and insertion of the spine-like ramuli. 3. A cross section of a branch. 4. A *ceramidium* on its peduncle:—the latter figures variously *magnified.*

Plate CXXXIII.



Vincent Brooks, Imp.

PLATE CXXXIII.

HALYMENIA SACCATA, *Harv.*

GEN. CHAR. ***Frond*** terete, compressed or flat, gelatinoso-membranaceous, dichotomous or pinnatifid, composed of two strata; the ***medullary*** stratum formed of a few, laxly interlaced, branching filaments, lying in gelatine; the ***cortical*** membranous, formed of minute, coloured cellules. ***Fructification:*** 1, ***favellæ*** immersed in the frond, suspended under the peripheric stratum; 2, cruciate ***tetraspores,*** scattered through the surface-cellules.—HALYMENIA (*Ag.*), from ἁλς, ***the sea,*** and ὑμην, ***a membrane.***

Frons teres, compressa v. plana, gelatinoso-membranacea, dichotoma v. vage pinnatifida, stratis duobus composita; strato medullari ex filis paucis laxe intricatis ramosis succo gelatinoso immersis, peripherico membranaceo cellulis minutis coloratis formato. Fruct.: 1, ***favellæ frondi immersæ, infra stratum periphericum suspensæ;*** 2, ***tetrasporæ sparsæ, cruciatim divisæ.***

HALYMENIA *saccata;* frond cylindrical, saccate, hollow, vaguely decompound; branches constricted at their insertion, simple, bag-like, tapering to a blunt extremity.

H. saccata; ***fronde cylindracea saccata cava vage decomposita; ramis ramulisque basi arcte constrictis simplicibus saccatis sursum attenuatis obtusiusculis.***

HALYMENIA saccata, ***Harv. in Hook. Fl. Tasm. v.*** 2. ***p.*** 327.

HAB. Georgetown, Tasmania, ***W. Archer, Esq.***

GEOGR. DISTR. Tasmania.

DESCR. ***Root*** discoid. ***Frond*** 8–12 inches long, ½–¾ inch in diameter at the thickest part, tapering to base and apex, quite simple, bag-like, hollow or filled with loose gelatine, the walls delicately and softly gelatinoso-membranaceous. This ***primary*** frond emits irregularly from its sides numerous secondary fronds or ***branches*** of similar character; and these throw out small tertiary fronds or ***ramuli,*** also similar, until, in full-grown specimens, the general frond becomes irregularly much-branched and dendroid, or rather, "*cactoid.*" No order of ramification is followed, and the lesser divisions may with equal propriety be described as branches, constricted at their insertion, or as proliferous repetitions of a simple primary frond. All the divisions taper to the extremity, which is either perfectly blunt or subacute. The ***walls*** of the tubular fronds are formed of horizontally placed, radiating, dichotomous strings of cellules, lying imbedded in transparent gelatine: they seem to rise from the remains of a network, which, probably,

in an early stage of growth, traverses the centre of the tube, but which disappears on the inflation of the branch. *Favellæ*, lying beneath the peripheric layer, are scattered over the branches; and cruciate *tetraspores* are dispersed among the filaments of the periphery, on separate individuals. The *colour* of the frond is a full rosy-red, paler in the tetraspore-bearing individuals, which are also more succulent than those that produce favellæ. The *substance* is very soft, gelatinous and full when recent; the frond closely adheres to paper in drying, and shrinks to a mere film.

This appears to be a rare species. As yet I have only seen two specimens, given me by William Archer, Esq., of Cheshunt, Tasmania; one of them producing *favellæ*, the other *tetraspores*. The general habit and fructification agree sufficiently with *Halymenia*, but the structure of the periphery is rather more complex. Still, there is nothing so discordant as to force us to construct a genus for our present plant. Externally there is a striking resemblance to two Algæ of very different structure and affinities, namely, our *Bindera splachnoides* (Plate CXI.), and the *Chrysymenia Enteromorpha* of the Keys of Florida. These three have the same colour, substance, and ramification, so much so, that, structure and fruit apart, they could with difficulty be distinguished: affording another evidence of the necessity of examining the intimate structure of Algæ, before deciding on their affinities.

Fig. 1. HALYMENIA SACCATA,—*the natural size.* 2. Portion of the periphery, with imbedded *tetraspores.* 3. A tetraspore. 4. Portion of periphery, with an immersed *favella*:—variously *magnified.*

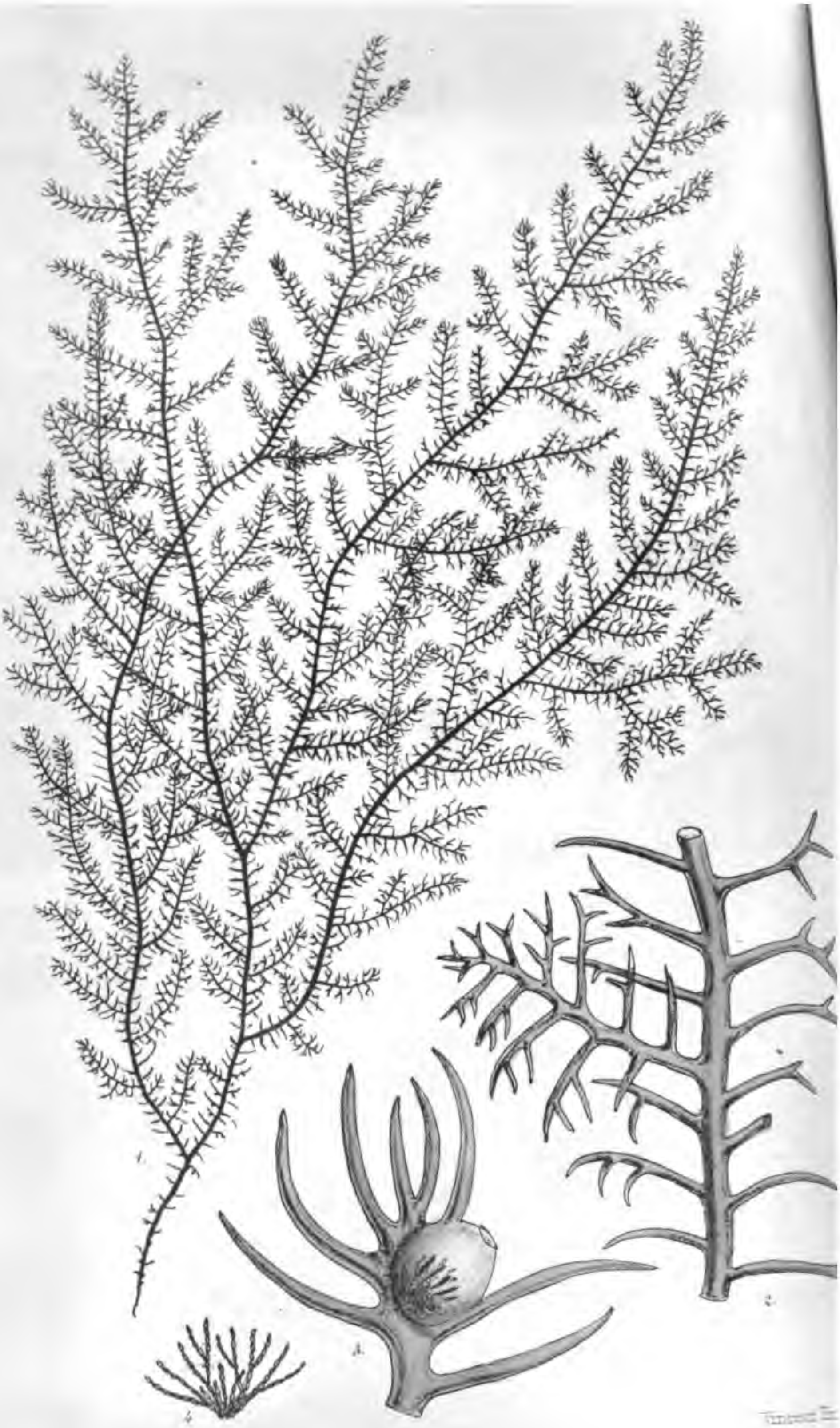

1.
2.
3.
4.

PLATE CXXXIV.

DELISEA HYPNEOIDES, *Harv.*

GEN. CHAR. *Frond* linear, compressed, two-edged, alternately decompound, distichous, the branches and ramuli pectinato-serrate, with an immersed costa, and central articulated filament; medullary stratum composed of roundish-angular, closely-packed cells; cortical, of very minute, coloured cellules in several rows. *Fruit:* 1, obliquely ovate *ceramidia,* sessile on the midrib, near the summit of the branches, containing a tuft of pear-shaped spores; 2, zonate *tetraspores* immersed in wart-like swellings (*nemathecia*) of the apices.—DELISEA (*Lamour.*), in honour of M. Delise, a French naturalist.

Frons linearis, compresso-anceps, alterne decomposita, disticha, ramis ramulisque argute pectinato-serratis, plus minus conspicue costata, filo centrali articulato percursa; strato medullari ex cellulis magnis rotundato-angulatis hyalinis, corticali ex cellulis minutis pluriserialibus coloratis formato. Fruct.: 1, *ceramidia ovata ad costam prope apices ramorum sessilia, intra pericarpium cellulosum sporas oblongo-pyriformes longe pedicellatas foventia;* 2, *tetrasporæ zonatim divisæ in verrucis apices ramulorum investientibus evolutæ.*

DELISEA *hypneoides;* frond filiform, slender, flaccid, flexuose, decompoundly much branched; branches erecto-patent, the primary long and virgate, secondary and tertiary short, all distichously ciliate; cilia filiform-subulate, distant, alternate or secund, often pectinate on one edge; ceramidia sessile on the rachis under the tips of the branches, ovate, opening transversely.

D. hypneoides; *fronde filiformi gracili flaccida flexuosa decomposite ramosissima, ramis erecto-patentibus, primariis longissime virgatis, secundariis tertiariisque minoribus, omnibus distiche ciliatis, ciliis filiformi-subulatis distantibus alternis v. secundis, sæpe uno latere pectinatis, ceramidiis infra apices ramulorum in rachide sessilibus lateralibus ovatis, ore laterali.*

DELISEA hypneoides, *Harv. Alg. Austr. Exsic. n.* 248. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 305.

HAB. Western Port, Victoria, *W. H. H.* Georgetown, Tasmania, *Rev. John Fereday.*

GEOGR. DISTR. South coast of New Holland. Tasmania.

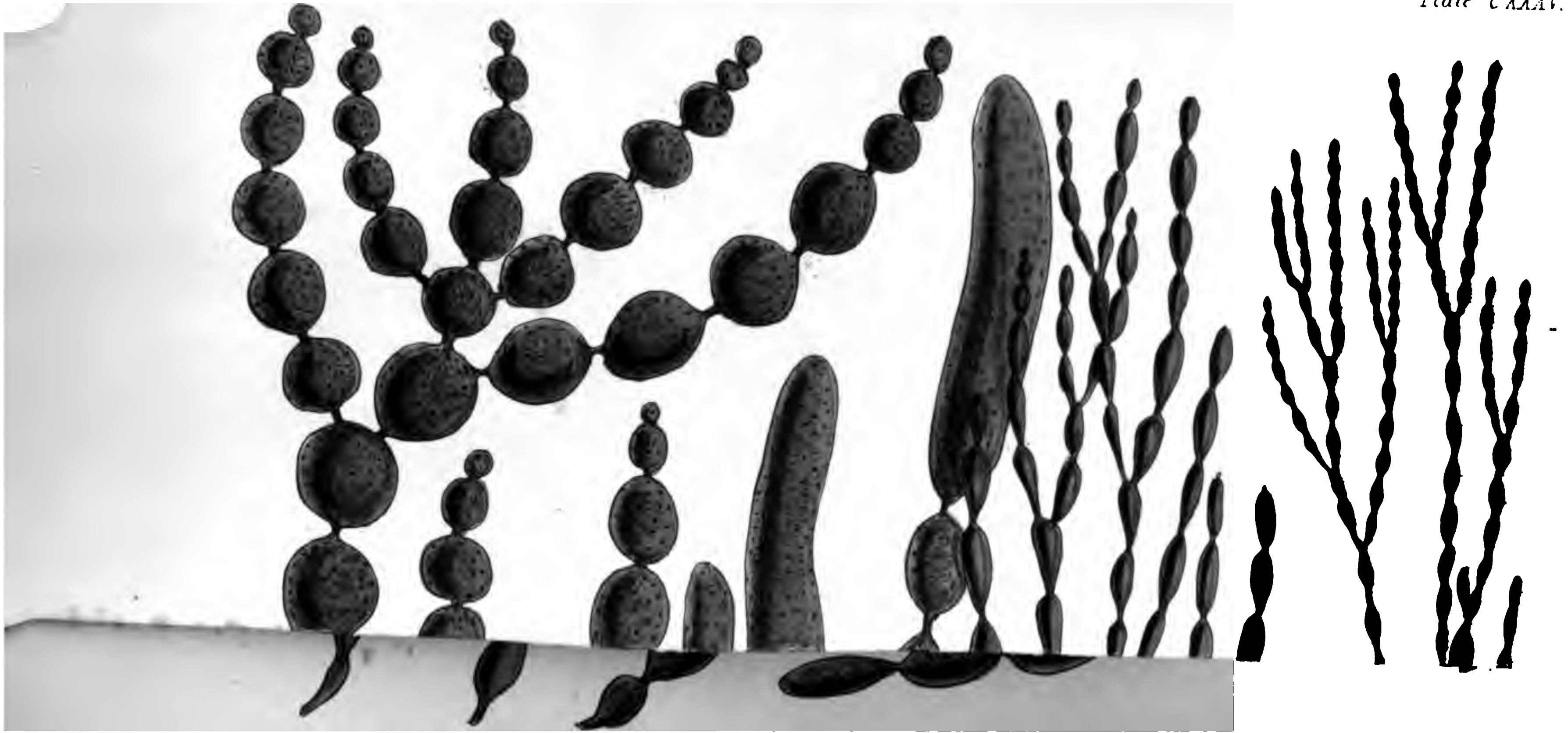
DESCR. *Frond* 2 feet long or more, scarcely quarter-line in diameter, filiform, subcompressed, excessively branched, distichous. Primary branches a foot or more in length, flexuous, irregularly set throughout with lateral, subalternate, secondary branches of various lengths, longer and shorter intermixed without order; these *secondaries* bearing a third or fourth series of similar but still shorter branchlets. Both the main frond, the branches, and ramuli are bordered at distances of about a line, with slender setaceo-subulate *cilia*. The *cilia* are horizontally patent or recurved, two lines long, and are either simple or pectinated on one side with a second series of similar cilia. The *conceptacles* are ovate, sessile immediately beneath the point of the smaller branches, their aperture being directed away from the apex of the branch: those examined (probably immature) did not contain any true spores, but a tuft of dichotomous, very slender, beaded filaments or *paranemata*. The *colour* is a deep full-red, becoming paler and more rosy in fresh-water. The *substance* is peculiarly soft and flaccid, and in drying the frond adheres most closely to paper.

This is much the most slender, most flaccid, and most diffusely branched species of *Delisea,* and is also one of the largest. Some of the most finely branched specimens are exceedingly slender and delicate, and beautifully feathery, with a habit more like that of a *Hypnea* than of the genus to which, by its fruit and structure, it truly belongs. It is not very uncommon at Western Port, but much rarer, apparently, in Tasmania.

Perfect *conceptacles* are still a desideratum. Those examined by me were either in an immature or an abortive state. None contained any true spores; and whether the moniliform filaments shown at Fig. 4 be the commencement of spores or merely paranemata is uncertain.

Fig. 1. DELISEA HYPNEOIDES,—*the natural size.* 2. Small portion of a branch, with ramulus. 3. Apex of a fruiting-branch, with its conceptacle. 4. Some of the barren filaments (*paranemata*) from the conceptacle:—variously *magnified.*

Plate CXXXV.



Vincent Brooks Imp.

Plate CXXXV.

HORMOSIRA BANKSII, *Dcne.*

Gen. Char. *Root* discoid. *Frond* without distinct organs, moniliform, branched; the internodes inflated and fertile. *Spore-cavities* sunk in the periphery of the vesicated internodes, diœcious. *Spores* linear-pyriform, subsessile. *Paranemata* simple.—Hormosira (*Endl.*), from *ὅρμος, a necklace,* and *σειρα, a chain.*

Radix discoidea. Frons, organis nullis discretis, moniliformis, ramosa; internodiis inflato-vesicatis, demum fertilibus. Scaphidia in peripherio vesicularum immersa, numerosissima, dioica. Sporæ lineari-pyriformes, subsessiles. Paranemata simplicia.

Hormosira ***Banksii;*** vesicated receptacles ovoid or obconical, wingless. *Dcne. An. Sc. Nat. ser.* 2. xvii. 330. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 285.

H. Banksii; *receptaculis ovoideis obconicisve teretibus.*

Var. *α. Banksii;* frond divaricate, with patent branches and very wide angles; vesicles cuneate, depressed at the summit, the terminal ovoid.

Hormosira Banksii, *Dne. l.c. Endl.* 3*rd Suppl. p.* 30. *J. Ag. Sp. Alg. v.* 1. *p.* 198. *Kütz. Sp. Alg. p.* 586.

Cystoseira Banksii, *Ag. Sp. Alg. v.* 1. *p.* 60; *Syst. p.* 284.

Fucus Banksii, *Turn. Hist. t.* 1.

Moniliformia Banksii, *Bory, Coq. p.* 134.

Var. *β. Labillardieri;* frond very long, di-trichotomous, with narrower axils; vesicles ovoid, rounded at each end, the terminal ones sometimes cylindrical.

Hormosira Billardieri, *Mont. D'Urv. Voy. Pôl. Sud, p.* 62. *J. Ag. Sp. Alg. p.* 199. *Kütz. Sp. Alg. p.* 586. *Fl. N. Zeal. v.* 2. *p.* 215.

Moniliformia Labillardieri, *Bory, Coq. p.* 133. *Rich. Astrolabe, p.* 18.

Fucus moniliformis, *Labill. N. Holl. t.* 262.

Var. *γ. Sieberi;* frond short, dichotomous, fastigiate; vesicles obconic, truncate at the upper extremity, and either truncate or tapering at the lower; terminal ovoid.

Hormosira Sieberi, *Dcne. l.c. Endl.* 3*rd Suppl. l.c. J. Ag. Sp. Alg. v.* 1. *p.* 199. *Hook. Fl. N. Zeal. v.* 2. *p.* 215.

Hormosira obconica, *Kütz. Sp. Alg. p.* 586.

Moniliformia Sieberi, *Bory, Coq. p.* 134. *A. Rich. N. Zeal. v.* 2. *p.* 139.

Var. δ. *gracilis;* very slender, *barren*, the internodes fusiform, tapering at each end.

Hormosira gracilis, *Kütz. Sp. Alg. v.* 2. *p.* 586.

Hab. Littoral rocks, from near high-water mark to the laminarian zone, along the south and south-east coasts of New Holland. Abundant.

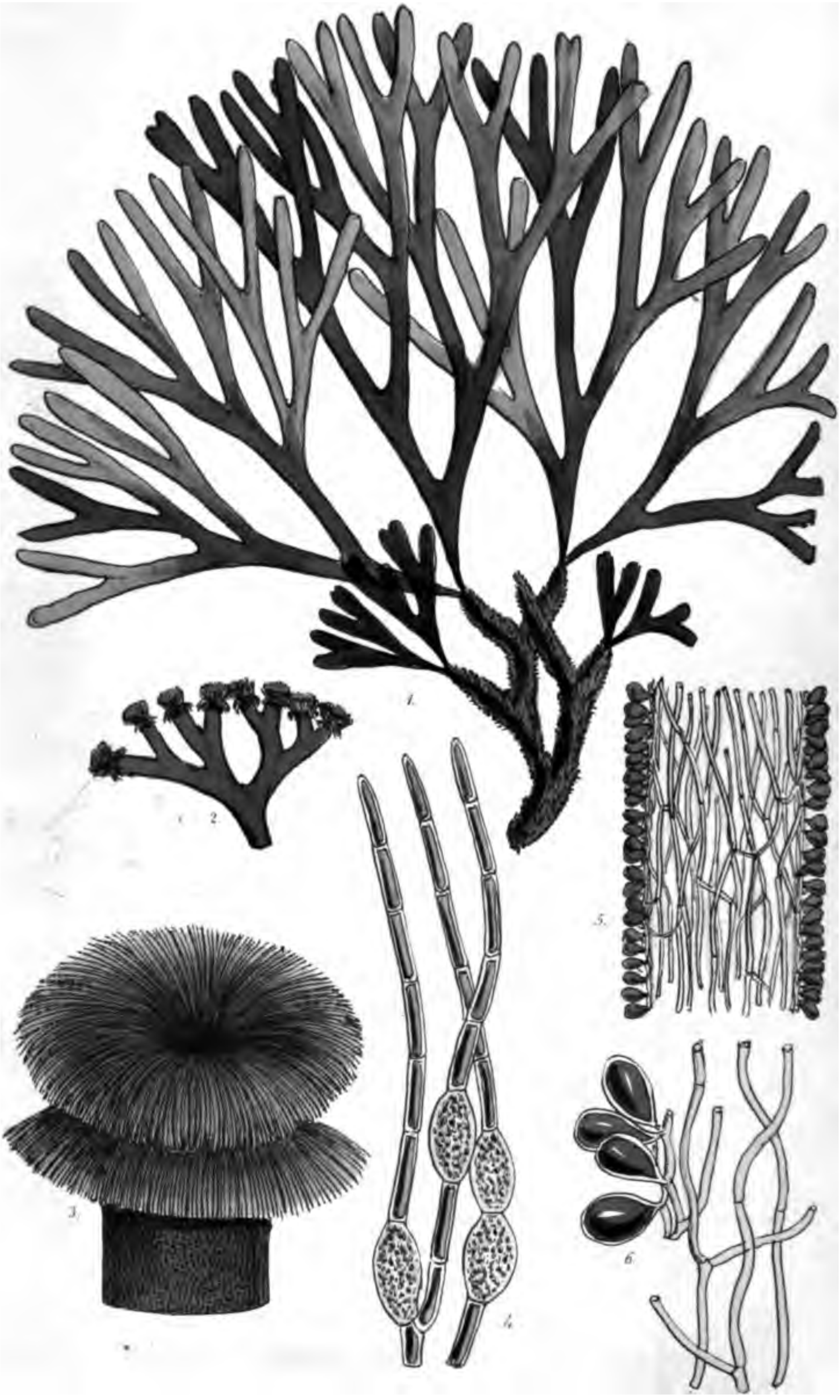
Geogr. Distr. Australia. Tasmania. New Zealand.

Descr. *Frond* from two inches to two or three feet or more in length, varying in dimensions according to the depth of water at which it grows, dichotomously or irregularly branched, consisting of a series of inflated internodes and filiform nodes; the internodes partaking of the characters of *vesicles* and *receptacles*. *Leaves* none. *Vesicated* internodes very variable in size and shape, spherical, oblong, ovoid, obconic, obovate, or somewhat cupped; occasionally prolonged into cylinders 2–3 inches long; the centre hollow, and more or less inflated, with a few central threads; the periphery coriaceous, cellular, and when fertile (as is usually the case) filled with spore-cavities of the usual fucoid structure. *Colour* olivaceous or bottle-green, becoming black in drying. *Substance* rigid.

Whoever has seen and carefully studied this plant on its native coasts will, if I mistake not, fully agree with me in reducing to one species the several synonyms enumerated, and the several forms represented on our Plate. The differences in size and shape of the *vesicles* seem to result merely from local causes; either from the depth of water at which the specimen was grown, or from exposure to open sea, or shelter in enclosed harbours. The form called *Billardieri* grows in deep water; *Banksii* in sheltered harbours; and *Sieberi* and *gracilis* on exposed tidal rocks or in small rock-pools. Intermediate forms between all the varieties may readily be found. But, in truth, this species does not present nearly so many variations as the *Fucus vesiculosus* of the northern hemisphere.

Fig. 1. Hormosira Banksii, var. *Billardieri*. 2. Var. *Banksii*. 3. Var. *Billardieri*, with cylindrical extremities. 4. Var. *Sieberi*. 5 and 6. Var. *gracilis:—all of the natural size.*

Plate CXXXVI



Vincent Brooks Imp.

PLATE CXXXVI.

GALAXAURA (MICROTHOE) MARGINATA, *Lamx.*

GEN. CHAR. *Frond* dichotomous, thinly incrusted with carbonate of lime, constricted as if jointed, or continuous, composed of longitudinal, colourless, interwoven, and anastomosing *medullary* filaments, and closely placed, inflated or tabular, coloured *peripheric* cellules. *Fruit* unknown.—GALAXAURA (*Lamx.*), a classical name; one of the Oceanidæ of Hesiod.

Frons dichotoma, calcareo-incrustata, articulato-constricta v. continua, plus minus transversim rugulosa, ex filis medullaribus tenuibus hyalinis longitudinalibus intertextis anastomosantibus, et cellulis periphericis subuniseriatis coloratis inflatis liberis v. complanatis, arcte cohærentibus, formata. Fructus ignotus.

GALAXAURA (Microthoe) *marginata;* stem cylindrical, hirsute, repeatedly forked, its branches bearing flabelliform, fastigiate, dichotomous fronds; segments linear, flat, slightly thickened at the margin, obtuse; peripheric cells obovate, inflated.

G. marginata; *stipite cylindraceo hirsuto pluries furcato; ramis frondes flabelliformes fastigiatas dichotomas ferentibus; laciniis linearibus planis marginatis obtusis; cellulis periphericis obovatis inflatis.*

GALAXAURA marginata, *Lamx. Polyp. p.* 264. *Dcne. Cor. Ann. Sci. Nat.* 2. *v.* 18. *p.* 114. *Kütz. Sp. Alg. p.* 530.

CORALLINA marginata, *Ell. et Sol. p.* 115. *t.* 22, *f.* 6.

HAB. Rottnest Island and King George's Sound, Western Australia, abundant, *W. H. H., G. Clifton.* Newcastle, New South Wales, *W. H. H.*

GEOGR. DISTR. Tropical Atlantic and Pacific Oceans. Indian Ocean. Port Natal. Rio Janeiro. Japan. Feejee and Friendly Islands, etc.

DESCR. *Root* a fleshy disc, covered with hair-like filaments. *Plant* tufted, diorganous, consisting of a cylindrical *stipes* and flat *fronds. Stipes* 1–2 inches high, rarely simple, mostly 2–3 times forked or fasciculately branched, cylindrical, rigid, 1–1½ line in diameter, densely clothed with horizontal, deep-red, jointed hairs. *Frond* springing from the apices of the branches of the stipes, 2–5 inches long, about 1½ line wide throughout, flabelliform in expansion, many times dichotomous, the segments erecto-patent, linear, flat, obtuse, slightly thickened or inflexed at the margin, scarcely channelled, with a minutely granulated, microscopically mottled surface. *Apices* commonly obtuse or emarginate, sometimes (as in Fig. 2) crowned with bright crimson, duplicate, brush-like tufts of articulated filaments. These brush-like tufts are probably connected with the fructification; the filaments composing them are either uniformly cylindrical, like *paranemata,* or some of their articulations are inflated and filled with minute dot-like granules, which may be either *zoospores* or *spermatozoids*. No *spores* have been detected. The *colour* of the fronds, when recent, is a deep, full dark-red, fading, on exposure, to pale-green and dirty-white; that of the *tufts* is a brilliant rosy-crimson. The *substance* is coriaceous, rather soft; in a young state the plant adheres imperfectly to paper in drying, but full-grown individuals rarely do.

A common inhabitant of the warmer seas throughout the world, often found on coral reefs or on rock of coral formation. With many others which secrete carbonate of lime, it was formerly classed among the flexible zoophytes, but it has no claim to a place in the Animal Kingdom.

At Fig. 2 is represented a fragment of a specimen recently received from Mr. Clifton, and which is in a state hitherto unobserved. Mr. Clifton describes it as presenting a most beautiful appearance when seen alive and under water. Each lip of the expanded branches then bears a tuft of bright-red filaments, resembling minute double roses or anemones. Mr. Clifton supposed these tufts to be connected with the fructification, and of the same nature as the involucral ramelli of *Ptilota* and *Wrangelia*, but I have in vain looked for spores or favellæ among them, and except the swollen cellules, above described as *antheridia*, be floral organs, nothing of the kind exists. It is just possible that, at a later period, favellæ may be found.

Fig. 1. GALAXAURA MARGINATA, and 2, a fragment with *male inflorescence?*,—*the natural size*. 3. One of the "brush-like tufts." 4. Threads from the same, bearing "*antheridia?*" 5. A longitudinal section of the frond. 6. Peripheric cells and medullary filaments from the same :—more or less highly *magnified*.

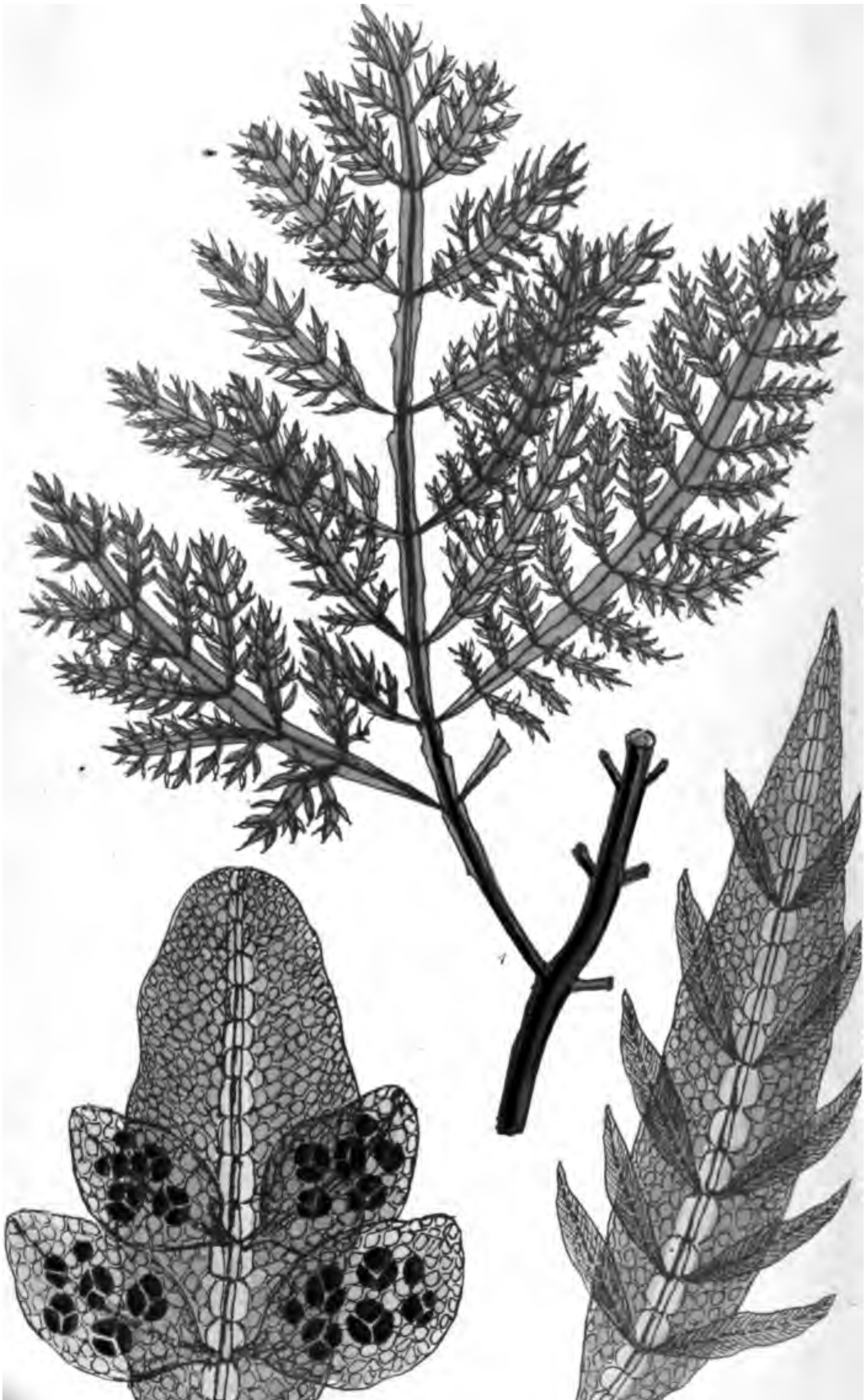

1.
2.
3.

Plate CXXXVII.

DELESSERIA DENDROIDES, *Harv.*

Gen. Char. *Frond* leaf-like, membranaceous, areolated, symmetrical, simple or branched, midribbed. *Fructification:* 1, hemispherical *conceptacles,* sessile on the midrib, or on a lateral nerve, containing a tuft of moniliform spore-threads on a basal placenta; 2, tripartite *tetraspores,* in definite *sori* or spots, on the frond, or on accessory leaflets.—Delesseria (*Ag.*), in honour of Baron Delessert, a distinguished patron of botany.

Frons foliacea, membranacea, areolata, symmetrica, simplex v. ramosa, costata. Fruct.: 1, *coccidia in costa venisque frondi sessilia, hemisphærica, fila sporifera moniliformia a placenta basali emissa foventia;* 2, *tetrasporæ triangule divisæ, in soros definitos collectæ.*

Delesseria *dendroides;* stem long, naked, cartilaginous, very thick (2–3 lines diameter), passing upwards into a much branched tree-like frond; fronds (*secondary*) ribbed, the rib emitting leaflets; leaflets in pairs, opposite, linear-lanceolate or oblong, acute or obtuse at each end, the full-grown with an opaque, the young with a jointed midrib; veins none; cells of the membrane in a single series, large, oblong; sori in minute leaflets issuing from the midrib of the youngest leaves.

D. dendroides; *caule elongato nudo carnoso-cartilagineo crassissimo* (2–3 *lineas diametro*) *apice in frondem ramosissimam dendroideam desinente; fronde costata foliolis e costa valida prorumpentibus ramosa; foliolis geminis exacte oppositis lineari-lanceolatis oblongisve utrinque acutis v. obtusis, adultis costa cartilaginea opaca, junioribus costa articulata percursis, venis nullis, membranæ cellulis strato unico dispositis magnis oblongis; soris in sporophyllis propriis e costa enatis.*

Delesseria dendroides, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 548; *Alg. Austr. Exsic. n.* 278.

Var. α. lancifolia; *foliolis lanceolatis, utrinque acutis.*

Var. β. oblongifolia; *foliolis lineari-oblongis, undulatis, utrinque obtusissimis.*

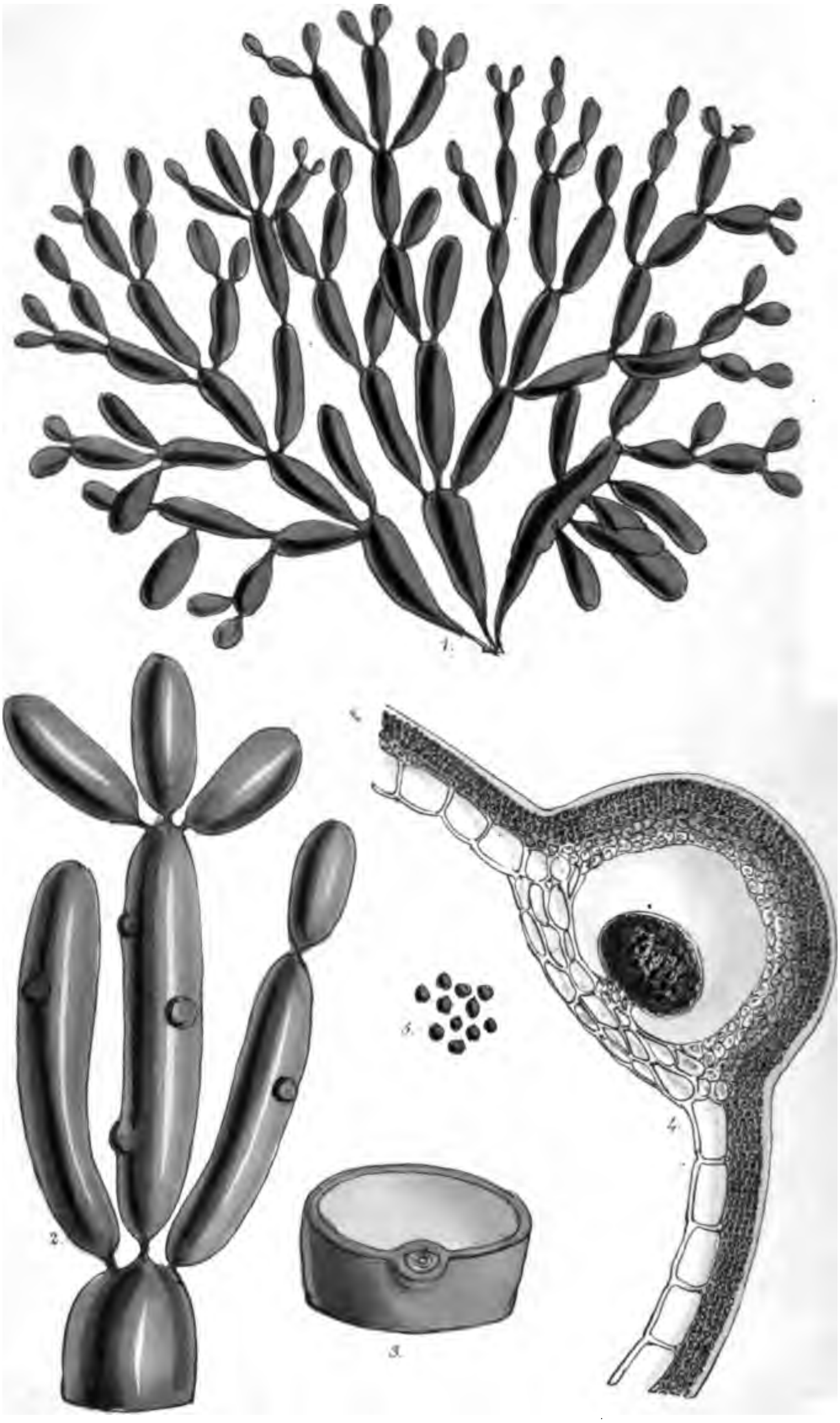
Hab. At Fremantle, rare; both varieties, *G. Clifton, W. H. H.*

Geogr. Distr. Western Australia.

Descr. *Root* knobby. *Frond* 1–1½ foot high, excessively branched, tree-like. *Stem* 2–3 lines thick, hard and horny-cartilaginous, dark-coloured and quite opaque, emitting opposite or alternate branches, and breaking up at the summit into numerous "leading shoots." The primary branches are cartilaginous and thickened like the stem, but are either two-edged or winged, and are regularly pinnate-branched throughout. The *pinnæ* are strictly opposite, leaf-like, midribbed, lanceolate or linear-oblong, and emit from their midrib 1, 2, 3, or 4 successive series of similar leaflets, each series springing in opposite pairs from the midrib of the preceding. The *midrib* in the older leaflets is opaque; in the younger it is articulate, each joint consisting of 3 cells, the middle cell narrow and cylindrical, the lateral broader and polygonal; the *membrane* of the leaf is very delicate and thin, formed of a single row of tabulated cells. *Conceptacles* unknown. *Tetraspores* in small *sori*, lodged in minute spore-leaves (*sporophylli*) borne on the midribs of the smaller leaflets. *Colour* a vivid pinky-red. *Substance* (except of the main stem) soft, soon decomposing in fresh-water, and closely adhering to paper in drying.

A very fine species, which it would require a folio plate to represent in all its beauty and size. Our octavo only suffices to show the botanical characters, and a single branch. When growing in the water, the general frond is quite like a beautiful roseate tree, with broad lanceolate leaves. The two varieties indicated above are very strongly marked, differing from each other nearly as much as *D. hypoglossum* differs from *D. ruscifolia,* and had they come from widely separated localities, I might perhaps have regarded them as distinct species. But at Fremantle both are found together under the same circumstances. One of them (*oblongifolia*) is generally fertile, producing tetraspores; the other (*lancifolia*) always, so far as I know, barren; and if it be ever fertile, it may possibly produce conceptacles. If this be so, the differences between them would be similar to what are often observed between tetraspore-bearing and conceptacle-bearing individuals of the same species, the former being, almost invariably, broader-fronded and more luxuriant than the latter.

Fig. 1. Delesseria dendroides, portion of the stem and one of the branches, —*the natural size.* 2. A small *leaflet* of var. β (*oblongifolia*), bearing *sporophylli* on its midrib. 3. A similar leaflet of var. α (*lancifolia*), bearing barren leaflets:—the latter figures *magnified.*



Vincent Brooks Imp.

Ser. RHODOSPERMEÆ. Fam. *Cryptonemiaceæ.*

PLATE CXXXVIII.

CHYLOCLADIA MUELLERI, *Harv.*

GEN. CHAR. *Frond* terete or subcompressed, rarely nodoso-articulate, alternately decompound, tubular; periphery formed of angular cells. *Fructification:* 1, conical, external *conceptacles,* opening by a pore, containing a favelloid nucleus, surrounded by a web of filaments; 2, triangularly parted, scattered tetraspores.—CHYLOCLADIA (*Grev.*), from χυλος, *juice,* and κλαδος, *a branch;* the tube contains watery fluid.

Frons teres v. subcompressa, nunc nodoso-articulata, alterne decomposita, tubulosa; tubo succo aquoso repleto; strato peripherico ex cellulis rotundato-angulatis contexto. Fruct.: 1, *cystocarpia simplicia, intra pericarpium externum conicum carpostomio demum apertum inclusa, reticulo arachnoideo cincta;* 2, *tetrasporæ triangule divisæ, sparsæ.*

CHYLOCLADIA *Muelleri;* frond membranous, purple-red, di-trichotomous, nodoso-articulate; internodes linear or elliptic-oblong, all separated by slender, short pedicels; conceptacles scattered on the internodes, hemispherical.

Ch. Muelleri; *fronde membranacea rubro-purpurea di-trichotoma fastigiata nodoso-articulata, internodis (articulisve) linearibus v. elliptico-oblongis, omnibus pedicello brevissimo filiformi sejunctis, cystocarpiis sparsis hemisphæricis.*

LOMENTARIA (*Gastroclonium*) Mülleri, *Sond. in Linn. v.* 25. *p.* 693.

HAB. Lefèbre's Peninsula, *Dr. F. Mueller,* 1847. At Carnac island, W. Australia, 1854, *Geo. Clifton.*

GEOGR. DISTR. Western and southern coasts of Australia.

DESCR. *Root* discoid. *Stem* very short, solid, cartilaginous, breaking up into numerous trichotomous, secondary fronds, 4–6 inches in length. Branches fastigiate, pretty regularly trichotomous, constricted into joint-like, linear or oblong internodes; every internode generally giving birth at its summit to 3, or sometimes to two similar internodes. All the internodes are separated by very slender filiform *nodes* (or pedicels) about ½ line in length: the terminal internodes are shorter and broader than the rest; the basal ones frequently long and pyriform. The *substance* is membranous, but not very thin, tenacious, and long resisting fresh-water; the membrane is composed of a layer of large, hyaline, subquadrate interior cells, protected externally by several rows of minute, coloured cellules. *Conceptacles* minute, scattered irregularly on the internode, prominent, containing within a large hollow

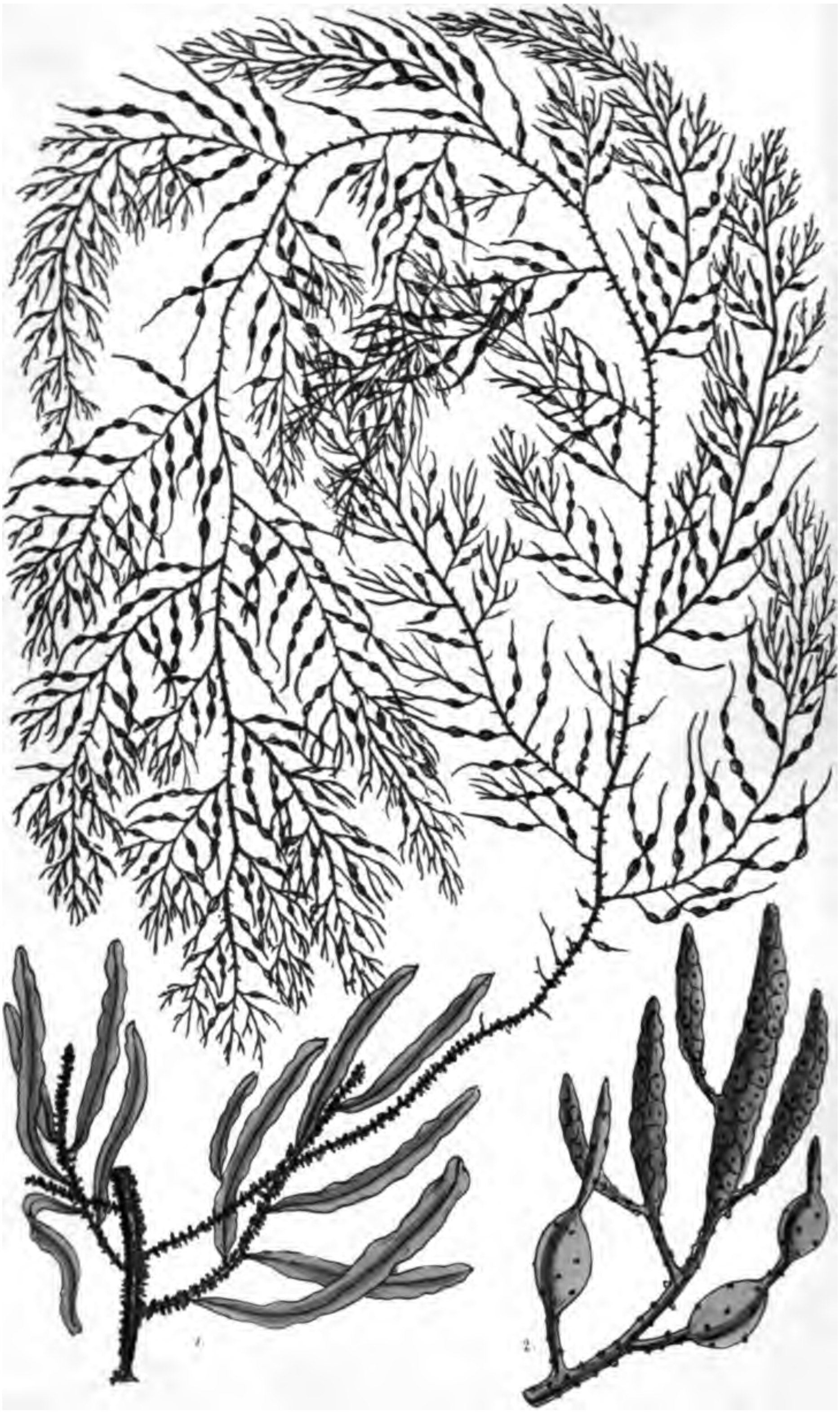
chamber, a simple basal *favella*. *Colour* a livid purplish-red. In drying the frond adheres pretty closely to paper.

At Plate LVII. (*Chylocladia Cliftoni*), I have figured a species nearly related to the present, but differing in colour and substance, and especially in the connection of the internodes. In *C. Cliftoni*, the constriction at the node, though considerable, is not greater than what is found in *C. articulata;* here every internode is *separated* by a slender, filiform pedicel.

C. Muelleri appears to be rare, very few specimens having yet been obtained from either of the two localities in which it is found.

Fig. 1. CHYLOCLADIA MUELLERI, — *the natural size.* 2. Some internodes bearing cystocarps. 3. Section of an internode and cystocarp. 4. Part of the periphery of the same, and the cystocarp. 5. Spores variously *magnified.*

Plate CXXIII



Vincent Brooks, Imp

Plate CXXXIX.

CYSTOPHYLLUM MURICATUM, *J. Ag.*

Gen. Char. *Root* scutate. *Frond* pinnate or dichotomous, dendroid, with a distinct stem, branches, and ramuliform leaves. *Vesicles* solitary or seriated, formed in the substance of the leaf, below its summit. *Receptacles* pod-like, torulose or moniliform, formed from the terminal leaves. *Scaphidia* polygamous. *Spores* obovoid.—Cystophyllum (*J. Ag.*), from *κυστις, a bladder,* and *φυλλον, a leaf.*

Radix scutata. Frons pinnatim v. dichotome ramosa, dendroidea, caule proprio, ramis foliisque ramuliformibus donata. Vesiculæ solitariæ v. seriatæ in folio infra apicem inflatæ. Receptacula siliquæformia, torulosa v. moniliformia, apice foliolorum evoluta. Scaphidia polygama. Sporæ obovoideæ.

Cystophyllum *muricatum;* stem short, muricate, multifid; subradical leaves broadly linear, entire, midribbed; fronds very long, slender, filiform, rough with gland-like cilia, pinnately much branched; branches spreading every way, irregularly inserted; pinnate or bi-tripinnate; vesicles solitary or 2–3 together, separated by filiform portions of the leaf-ramulus, oval; receptacles cylindrical-fusiform, subracemose.

C. muricatum; *caule brevi muricato multi-ramoso; foliis subradicalibus lato-linearibus integris costatis; frondibus longissimis filiformibus glanduloso-muriculatis pinnato-ramosissimis; ramis undique egredientibus vagis pinnatis bipinnatisve; vesiculis solitariis v. sæpe ternis sejunctis ovalibus; receptaculis cylindraceo-fusiformibus subracemosis.*

Cystophyllum muricatum, *J. Ag. Sp. Alg. v.* 1. *p.* 231. *Harv. Alg. Austr. Exsic. n.* 32.

Sirophysalis muricata, *Kütz. Phyc. Gen. p.* 368; *Sp. Alg. p.* 602.

Cystoseira muricata, *Ag. Sp. v.* 1. *p.* 66; *Syst. p.* 285.

Cystoseira trinodis, *Ag. Ic. t.* 12 (*nec Sp. Alg.*). *Sond. Preiss. v.* 2. *p.* 159.

Fucus muricatus, *Turn. Hist. t.* 112.

Hab. Western Australia, *Preiss.* King George's Sound to Port Jackson, in various places, *W. H. H.* Port Philip, *Dr. Mueller.*

Geogr. Distr. Indian Ocean. West, south, and east coasts of New Holland, generally in bays or harbours.

Descr. *Stem* 1–3 inches long, 1–2 lines in diameter, densely muricated, bearing many lateral or terminal branches; some of them short, producing a few simple, linear, flat, midribbed leaves; others long, bearing *fronds. Fronds*

2–3 feet long or more, not twice as thick as hog's-bristle, more or less densely covered with minute, gland-like, filiform processes, spreading to all sides, the lower pair commonly denuded of branches, the upper closely set with spirally or irregularly inserted lateral branches, 3–8 inches long. Secondary *branches* filiform, pinnated in their lower half with slender, simple, ramuliform leaves, which bear in their substance usually three ovoid, separated vesicles; in their upper half bi-tripinnate, with fewer vesicles. *Receptacles* formed at the ends of the branches, from the terminal ramuli or leaflets, at length somewhat racemose. *Colour* a full-olive, turning black in drying. *Substance* coriaceous when recent, rather brittle when dry.

The genus *Cystophyllum* holds an intermediate place between *Cystoseira* and *Cystophora;* from the former it differs in having the vesicles seriated in the ultimate *undivided* ramuli or "leaves," instead of in the larger or penultimate branches; and from the latter in having vesicles in the ordinary "leaves," and remote from their apices, instead of *terminal* on specially metamorphosed leaves, distinct from the ordinary.

C. muricatum is the commonest species, and is found throughout the Indian Ocean, as well as on the Australian coast. In Australia it generally grows in sheltered harbours, and in such situations is often very much covered with minute zoophytes and other parasites.

Fig. 1. CYSTOPHYLLUM MURICATUM,—*the natural size.* 2. Fertile apices, converted into receptacles,—*enlarged.*

Plate VI

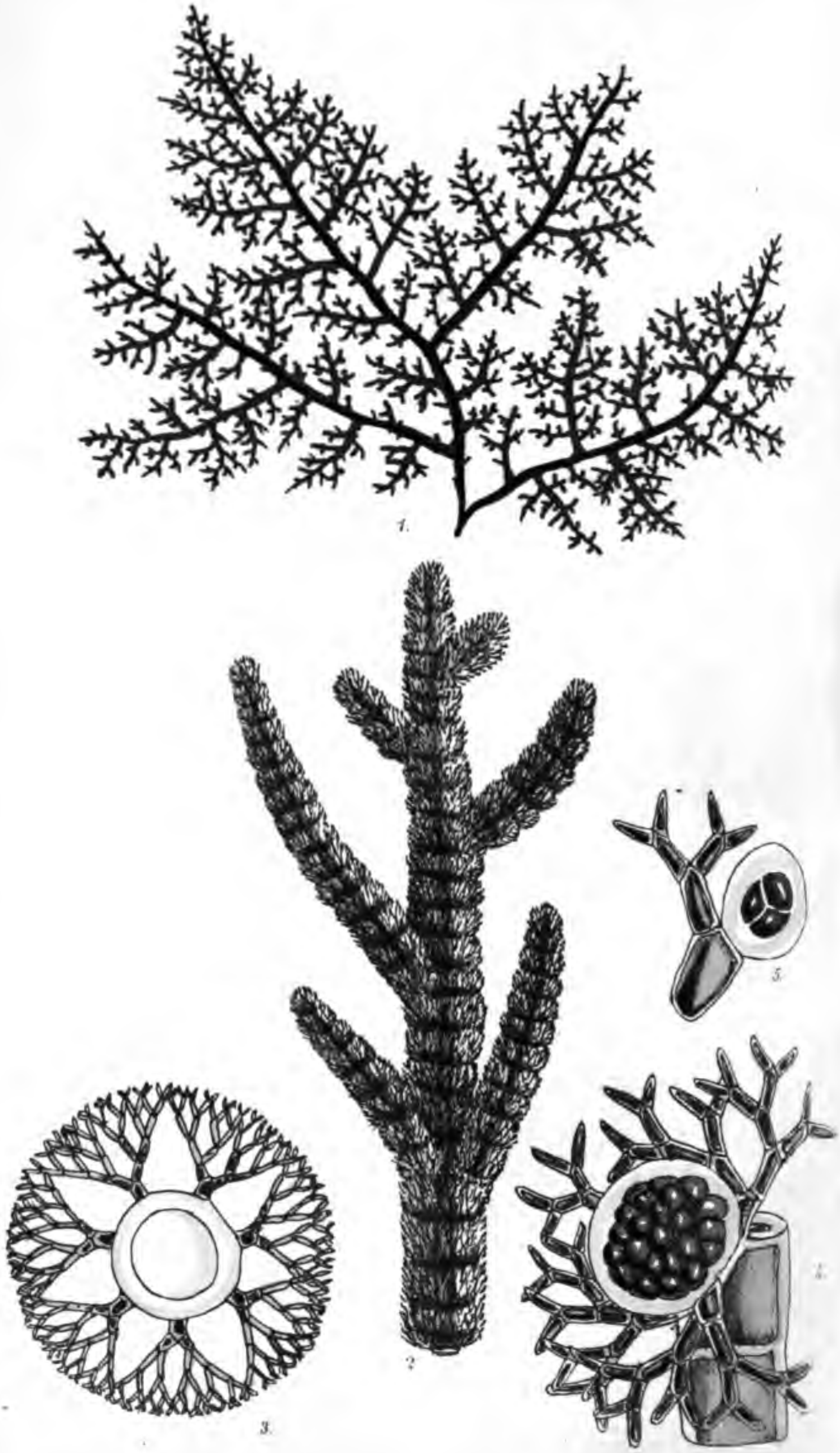


Plate CXL.

CROUANIA VESTITA, *Harv.*

en. Char. *Frond* nodoso-articulate, alternately decompound, consisting of an articulate, monosiphonous, primary filament (or *axis*) emitting at the nodes densely whorled, minute, dichotomo-fastigiate, free, articulated ramelli. *Fructification:* 1, solitary subterminal *favellæ*, surrounded by ramelli; 2, external triangularly parted *tetraspores*, borne on the ramelli.—Crouania (*J. Ag.*), in honour of the brothers *Crouan*, of Brest, celebrated among French Phycologists.

Frons nodoso-articulata, alterne decomposita, e filo primario (axi) monosphonio articulato ramellos minutissimos dichotomo-fastigiatos articulatos verticillatos ex nodis emittente constituta. Fruct.: 1, *favellæ subterminales, solitariæ, inter ramellos absconditæ;* 2, *tetrasporæ triangule aut transversim divisæ, ad ramellos lateraliter affixæ.*

rouania *vestita;* frond ultra-setaceous, decompoundly much branched, scarcely gelatinous; branches and branchlets patent or divaricate, attenuated, all densely or continuously clothed with whorled ramelli; ramelli divaricately multifid; favellæ solitary, at the ends of short branchlets, surrounded by ramelli; tetraspores spherical, triangularly divided.

C. vestita; *fronde ultrasetacea decomposite ramosissima vix gelatinosa; ramis ramulisque patentibus divaricatisve attenuatis, omnibus ramellis densissime velatis teretibus vix nodulosis, ramellis divaricato-multifidis; favellis solitariis in ramulis minoribus inter ramellos immersis, tetrasporis sphæricis triangule divisis.*

Crouania vestita, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 558; *Alg. Austr. Exsic. n.* 486.

Hab. On *Zostera,* and the smaller Algæ. Rottnest Island and King George's Sound, *W. H. H.* Fremantle, *George Clifton.*

eogr. Distr. Western Australia.

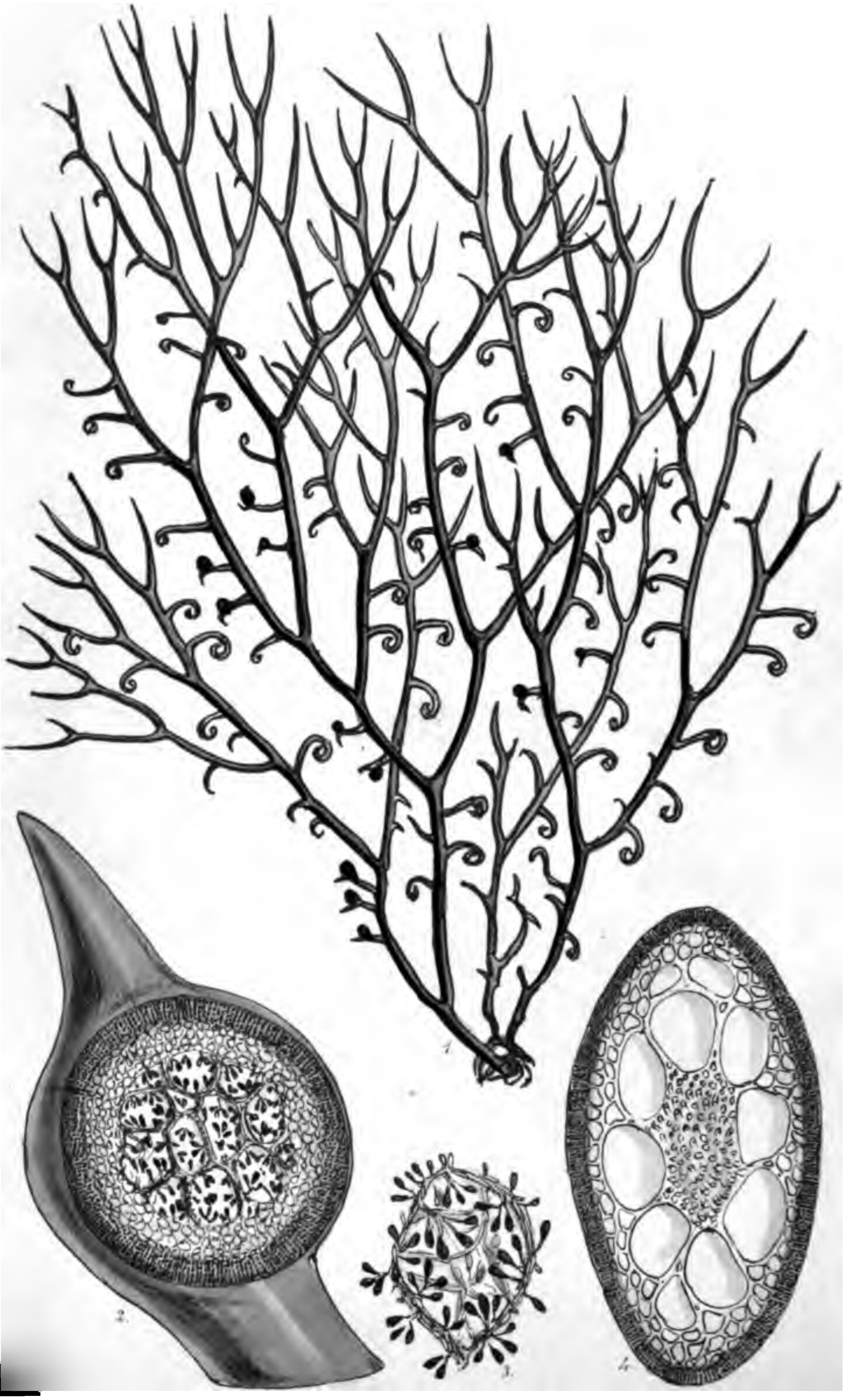
escr. *Fronds* solitary or tufted, 1–3 inches long, from half a line to nearly a line in diameter, excessively branched in an irregularly pinnate order, 3–4 times pinnate; the branches and ramuli very unequal, long and short intermixed, all very patent or subhorizontal, cylindrical, tapering to the apex. The whole frond throughout is sub-equably clothed with densely set whorled ramuli, so closely imbricating on each other that, except in the lower part of the frond, the *nodose* arrangement is scarcely obvious. *Ramelli* many times dichotomous, short-jointed, with patent or divaricate ramifications. *Favellæ* subglobose, with a wide, gelatinous pericarp, many-spored, hidden among the ramelli at or near the ends of the smaller branchlets. *Tetraspores* attached to the ramelli, formed by the transformation of one of the lateral segments. *Colour* a deep full-red, rosy toward the tips. *Substance* soft and spongy, but not very gelatinous. In drying the frond adheres closely to paper.

A robust species of *Crouania,* intermediate in size between *C. attenuata* and *C. insignis.* From both these it is at once known by the perfectly continuous villum of ramelli that clothes every portion of the axis, so as completely to conceal its articulation. In very few places is there any interruption of the continuity, or disposition to become nodose.

Crouania is nearly allied to *Callithamnion,* but has a peculiar habit, and is sufficiently distinct in character. The finest species is *C. insignis,* figured in Hooker's 'Flora Tasmanica,' and which therefore will not be re-figured in the present work.

C. attenuata, the earliest-known species, is found in Europe, the Gulf of Mexico, and on the coasts of Australia.

Fig. 1. CROUANIA VESTITA,—*the natural size.* 2. Apex of a branch. 3. Transverse section, at a node. 4. Favellæ (partly) surrounded by ramelli, some removed. 5. A *tetraspore* on a portion of a ramellus :—variously *magnified.*



Vincent Brooks, Imp.

Plate CXLI.

ACANTHOCOCCUS EWINGII, *Harv.*

Gen. Char. *Frond* filiform or compressed, cartilaginous, vaguely much branched, composed of three *strata ;* the *medullary* stratum of longitudinal, interwoven, and anastomosing filaments ; the *intermediate* of large, roundish, empty cells, smaller outwards ; the *cortical,* of minute, coloured, vertically seriated cellules. *Fructification :* 1, half-immersed *conceptacles,* containing, within a thick-walled pericarp, minute, pedicellate, oblong *spores,* attached to many slender, interlaced, parietal, and internal placentæ ; 2, *tetraspores ?*—Acanthococcus (*Hook. fil. et Harv.*), from *ακανθος, a thorn,* and *κοκκος, fruit.*

Frons filiformis v. compressa, cartilaginea, vage ramosissima, stratis tribus contexta ; strato medullari filis longitudinalibus intertextis anastomosantibus, intermedio cellulis magnis rotundatis vacuis extus sensim minoribus, corticali cellulis minutis coloratis verticaliter seriatis composito. Fruct. : 1, *cystocarpia semi-immersa, intra pericarpium crassum sporas minutas pedicellatas oblongas e placentulis plurimis tenuibus anastomostantibus parietalibus et internis egredientes foventia ;* 2, *tetrasporæ ?*

Acanthococcus *Ewingii ;* frond terete, robust, dichotomous, subfastigiate ; ramuli lateral, subsecund, very patent, reflexed or uncinate, acute, subuliform ; conceptacles swelling within short ramuli, below the apex.

A. Ewingii ; *fronde terete robusta dichotoma cæspitosa et subfastigiata ; ramulis lateralibus subsecundis patentissimis reflexis v. hamatis acutis subuliformibus, cystocarpiis in ramulis brevibus infra apicem semi-immersis.*

Acanthococcus Ewingii, *Harv. in Herb.* (*olim*).

Mychodea hamata, *Harv. Alg. Exsic. Austr. n.* 415. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 323.

Hab. Tasmania, *Rev. Mr. Ewing.* Georgetown and Port Arthur, Tasmania, *W. H. H.* South Australia, *Dr. Curdie.* Port Fairy, abundantly, *W. H. H.*

Geogr. Distr. Southern shores of Australia. North and south coasts of Tasmania.

Descr. *Root* a mass of interlaced branches. *Fronds* densely tufted and often intricately interlaced, six or twelve inches long, 1–1½ line in diameter, rather succulent, excessively branched, either pretty regularly dichotomous or flexuous and vaguely branched, the branches directed to all sides, erecto-patent, with rounded axils and subulate, acute apices. The branches are sometimes nearly destitute of lateral ramuli, but usually are furnished with them in greater or less number: these are 6–10 lines long, issuing at right-angles from the branch, and extending either horizontally or arching backwards, or very often strongly *hooked* at the point, and clasping, the longer ones becoming tendril-like. *Conceptacles* are formed in short, lateral ramuli, generally just below the apex, which extends beyond, like a *horn*, on the pericarps; the *placentæ* are numerous, and form a lax network, filling up the cavity, and bearing the scarcely tufted spores at intervals over the whole surface. The *medullary* stratum is copious and dense, and the *cortical* thick and strong. The *colour* is a dark brown-purple, becoming browner or blackish in the herbarium. The *substance* is firm; the frond shrinks in drying, and but imperfectly adheres to paper.

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My first acquaintance with this plant was from a small specimen several years ago communicated by the Rev. Mr. Ewing, of Hobarton, to Mr. Gould, the ornithologist, and then named by me in manuscript as a new species of *Acanthococcus*, and dedicated to its discoverer. Afterwards, having myself collected the plant abundantly in the habitats above given, I was struck with its general resemblance in habit and cauline structure to the species of *Mychodea*, and hastily supposing an error in the former analysis, transferred it, without further examination of the *cystocarp*, to the genus *Mychodea*, and published it as *M. hamata*, in Fl. Tasm. But having occasion to make a more careful dissection, when preparing the figure for the present work, the structure of the *cystocarp*, repeatedly examined, has convinced me that my earliest analysis was correct, and I have consequently restored the name first given. It seems to be quite distinct from any described species.

Fig. 1. ACANTHOCOCCUS EWINGII,—*the natural size.* 2. Section through a *cystocarp*. 3. Portion of the placental network, with the spores *in situ*. 4. Transverse section of the frond:—*magnified.*
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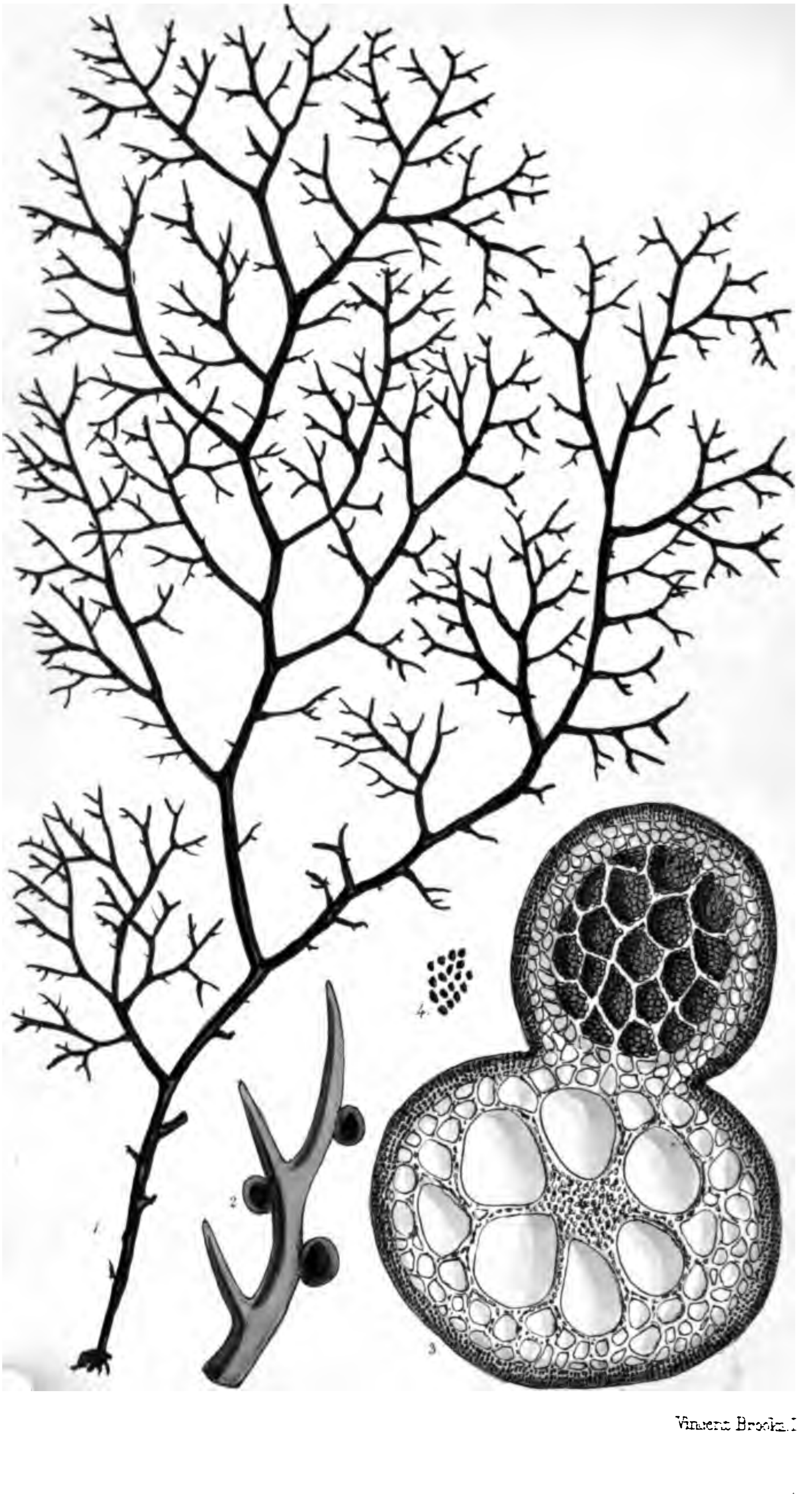
Plate CXI



Vincent Brooks, Imp.

PLATE CXLII.

MYCHODEA CARNOSA, *Hook. fil. et Harv.*

GEN. CHAR. *Frond* filiform, cartilaginous, alternately decompound, dendroid, composed of three strata; the *medullary* stratum of longitudinal and excurrent, interwoven and anastomosing filaments; the *intermediate* of large, roundish, empty cells, smaller outwards; the *cortical* of minute, coloured, vertically seriated cellules. *Fructification:* 1, external, lateral or terminal *conceptacles,* containing, within a thick-walled pericarp, a compound *nucleus,* consisting of many confluent *nucleoli,* or masses of roundish-angular spores; 2, zonate *tetraspores,* dispersed in the branches and ramuli.—MYCHODEA (*Harv.*), from *μυχος, an internal cavity,* or secret chamber, alluding to the large empty cells of the intermediate stratum of the frond.

Frons filiformis, cartilaginea, alterne decomposita, dendroidea, stratis tribus contexta; strato medullari filis longitudinalibus et excurrentibus intertextis anastomosantibus, intermedio cellulis maximis rotundatis vacuis extus sensim minoribus, corticali cellulis minutis coloratis verticaliter seriatis composito. Fruct.: 1, *favellidia intra pericarpium externum laterale v. terminale excepta;* 2, *tetrasporæ zonatim divisæ, sparsæ, frondi immersæ.*

MYCHODEA *carnosa;* frond dendroid, excessively branched; branches flexuous, patent, repeatedly divided, spreading every way, attenuated upwards, the ultimate subdichotomous; ramuli minute, spine-like, irregularly scattered; conceptacles spherical, sessile on the lesser branches and ramuli, lateral, minute.

M. carnosa; *fronde dendroidea ramosissima; ramis flexuosis patentibus pluries divisis quoquoversum egredientibus sensim attenuatis, penultimis subdichotomis; ramulis lateralibus minutis spinæformibus sparsis; cystocarpiis minutis sphæricis ad latera ramorum minorum sessilibus.*

MYCHODEA carnosa, *Hook. fil. et Harv. in Lond. Journ. Bot. v.* 6. *p.* 408. *Harv. Alg. Austr. Exsic. n.* 411. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 323.

CYSTOCLONIUM carnosum, *Kütz. Sp. Alg. p.* 723. *J. Ag. Sp. Alg. v.* 2. *p.* 309.

HAB. King George's Sound; Cape Riche; and Port Philip Heads, *W.H.H.* Lefèvre's Peninsula, *Dr. F. Mueller.* South Australia, *Dr. Curdie.* Georgetown, Tasmania, *R. Gunn, W. H. H., Rev. J. Fereday, etc.*

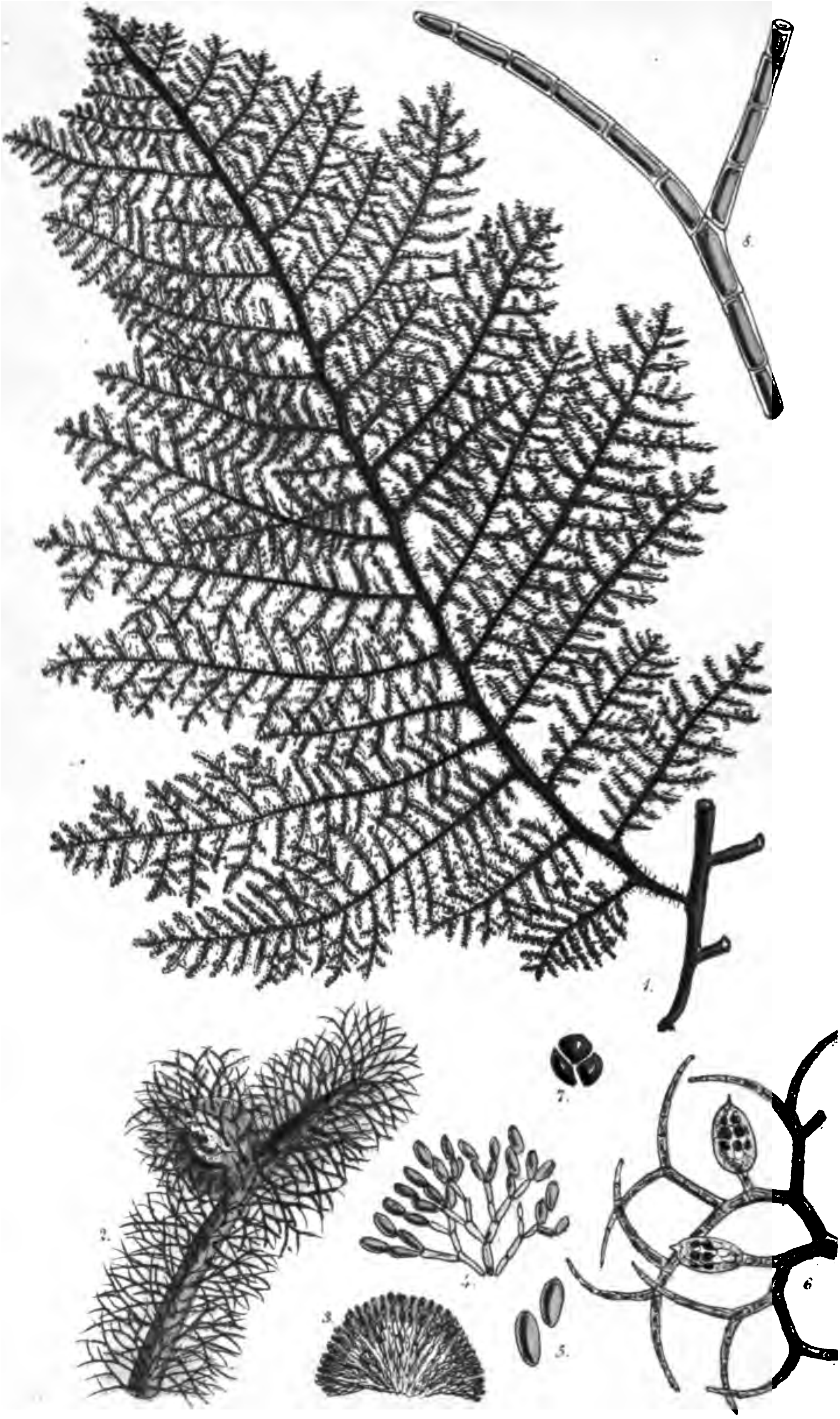
DESCR. *Root* branching. *Frond* 6–18 inches long or more, with a leading, simple or divided stem, densely set throughout with irregularly inserted, unequal, patent branches. *Branches* flexuous, spreading to all sides, once, twice, or several times irregularly decomposed, the smaller subdichotomous; all gradually attenuated upwards and ending in acute points, naked or furnished with minute, lateral, spine-like, patent ramuli. All the axils are rounded. The lesser branches are often secund; the ramuli sometimes converted into tendrils. *Cystocarps* as large as poppy-seed, rather numerous on the upper or under edges of the lesser branches, often secund, containing a compound *nucleus* (*favellidium*) of densely packed spores. *Colour* a dull brown-red, becoming darker in drying. *Substance* cartilaginous and fleshy, firm, rather stiff. In drying the plant shrinks, and very imperfectly adheres to paper.

A comparison of the lower half of Fig. 3 of the present Plate with Fig. 4 of Plate CXLI., will show how close an agreement there is in cellular structure between the frond of *Acanthococcus* and of this, the typical species of *Mychodea*, although the structure of the *cystocarp* in these genera is so different that they cannot be referred to the same Natural Family, one having pedicellate spores laxly springing from a honeycombed placenta, the other having dense *masses* of spores merely separated by the dead cell-walls within which they were organized.

The genus *Mychodea* is almost the same as *Cystoclonium*, with which Kützing and Agardh unite it, but differs in having a perfectly *external*, instead of an *immersed*, cystocarp. It therefore differs from *Cystoclonium* nearly as *Gigartina* differs from *Iridæa*, and so far as known is confined to the Australian seas, where there are several species. The generic character formerly given in Lond. Journ. Bot. is incorrect, and now amended.

Fig. 1. MYCHODEA CARNOSA,—*the natural size.* 2. Apex of a small fertile branch, with three conceptacles. 3. Cross section of the frond, and of a *conceptacle.* 4. *Spores* from the latter:—*magnified.*

Plate CXLIII



Vincent Brooks

PLATE CXLIII.

DASYA HAFFIÆ, *Harv.*

GEN. CHAR. *Frond* filiform or compressed, dendroid; stem and branches coated with small, polygonal cells (rarely articulated, and many-tubed); the axis articulate, composed of several radiating cells surrounding a central cavity; ramelli articulated, one-tubed. *Fructification:* 1, ovate or urceolate *ceramidia;* 2, lanceolate *stichidia,* attached to the ramelli, and containing triangularly-parted tetraspores in tranverse rows.—DASYA (*Ag.*), from δασυς, *hairy.*

Frons filiformis v. compressa, dendroidea. Caulis ramique majores strato cellularum corticati (raro pellucide articulati), ramellis monosiphoniis obsessi; axis articulatus, ex cellulis pluribus radiantibus tubum centralem cingentibus formatus. Fruct.: 1, *ceramidia ovata v. urceolata;* 2, *stichidia lanceolata, ex ramellis enata, tetrasporas transversim ordinatas foventia.*

DASYA *Haffiæ;* stem tall, villous, opaque, cartilaginous, decompoundly plumoso-pinnate; the virgate, distichous, subtriply-pinnate branches and the patent ramuli densely ramelliferous; ramelli rosy, clothing all parts, squarrose and curled, dichotomous, with patent axils and scarcely attenuate, subacute points; articulations of the ramelli once and a half to twice as long as broad; ceramidia at or near the ends of the ultimate pinnæ, sessile, globose, with a prominent orifice, densely clothed with (quasi-)involucral ramelli; stichídia minute, oval, mucronate.

D. Haffiæ; *caule elato villoso opaco cartilagineo decomposite plumoso-pinnato; ramis virgatis distichis subtripinnatis ramulisque patentibus densissime ramelliferis; ramellis roseis undique insertis squarroso-crispatis dichotomo-multifidis, axillis patentibus apice acutis vix attenuatis, articulis ramellorum diametro sesqui-subduplo-longioribus; ceramidiis sæpe pinnulos ultimos terminantibus globosis ore porrecto densissime ramellis involucratis et vestitis; stichidiis minutis ovalibus mucronatis.*

DASYA Haffiæ, *Harv. Alg. Exsic. Austr. n.* 222. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 303.

HAB. Philip Island, Western Port, *W. H. H.* Georgetown, Tasmania, *R. Gunn.* Table Cape, *Miss M'Kenzie.*

GEOGR. DISTR. Shores of Bass's Straits.

DESCR. *Root* discoid. *Frond* 12–18 inches high, and as much in the expansion of the branches, the stem and principal branches 1–1¼ lines in diameter. *Stem* undivided or forked, closely set throughout with patent distichous branches, which are once, twice, or thrice pinnated with successive series of lesser distichous branchlets. Every part of the frond, down to the ends of the pinnules, is opaque, the surface densely coated with small cellules, hiding the articulated axis: the stem and principal branches are softly villous; the rest of the frond densely clothed with *ramelli*. The ramelli are half a line long, very patent, squarrose or curled, bright rosy-red, and repeatedly dichotomous, soft, but not very flaccid, and acute, but not attenuate. The *cystocarps* are sessile at or near the ends of the pinnules, and are densely covered with ramelli, besides being often almost hidden in a dense tuft or pseudo-involucre of similar ramelli: those examined by me contain a dense, basal, pulvinate tuft of dichotomous, submoniliform filaments, whose terminal cells separate, *as spores* (?): very unlike the spores of other species of *Dasya*. The *stichidia* are minute, borne as usual on the ramelli, and similar in structure and contents to those of other species. The *colour* is either bright-rosy, or a brownish-red, and in drying turns rather darker. The *substance* is soft, holding water like a sponge, but not gelatinous; and in drying the frond adheres very closely to paper.

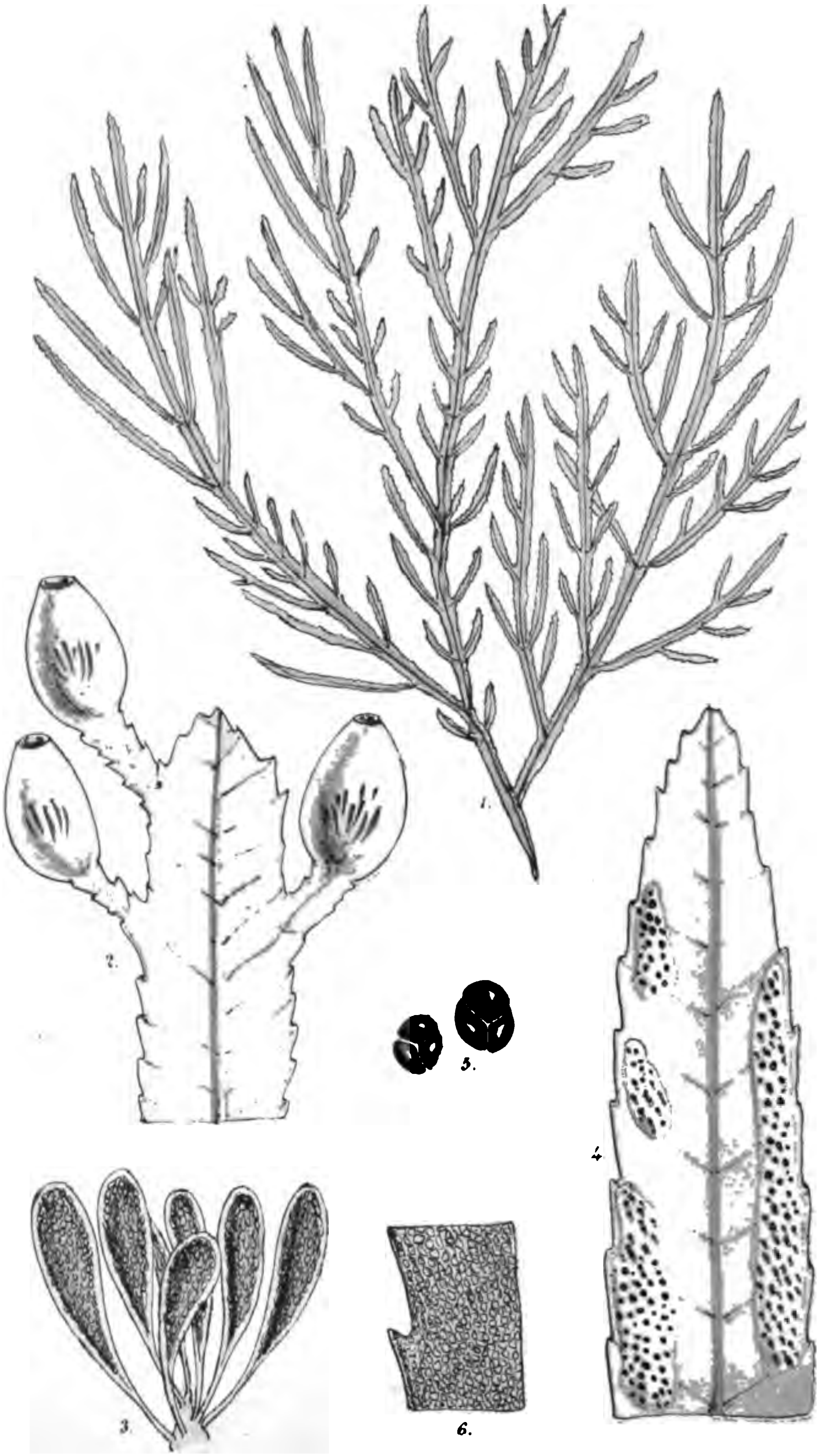
* * *

A very fine species of *Dasya*, one of many interesting Algæ collected by me while staying with my hospitable friends, Mr. and Mrs. M'Haffie, of Philip Island, Western Port, and selected to bear the name of the lady of the island. It has so much the aspect of a *Wrangelia*, that at first I had referred it to that genus, but the fructification, so far as known, is that of a *Dasya*. I cannot look on the *cystocarps* as being in a normal state; or if they be, the present Alga must be considered the type of a new genus, and removed from the *Rhodomelaceæ* to—*perhaps* the *Spyridiaceæ ?*

At Fig. 3, 4, and 5 are given details of the contents of the *ceramidium*, and these are very unlike the properly organized spore-threads and spores of a *Dasya ;* but in all other characters, both of frond and *tetrasporic* fructification, the agreement with *Dasya* is complete. But may not the densely crowded *ramelli* that spring from the walls of the *ceramidium* be regarded as an indication of the *abnormal* state of that organ?

Fig. 1. DASYA HAFFIÆ; a branch,—*the natural size*. 2. Apex of a pinnule, with a *ceramidium* near the point. 3. Dichotomous filaments from the (imperfectly organized?) *ceramidium*. 4. Some of these threads,—*enlarged*. 5. *Spores ?*, from the same. 6. A ramellus, with *stichidia*. 7. A *tetraspore*: —the latter figures variously *magnified*.

Plate CXL.



Vincent Brooks, Imp.

PLATE CXLIV.

CLADHYMENIA CONFERTA, *Harv.*

GEN. CHAR. *Frond* membranous, flat, thin, linear, distichously pinnatifid, formed of large, polygonal, granuliferous, internal cells, coated externally with minute, coloured cellules. *Fructification:* 1, ovate *ceramidia,* containing a tuft of pear-shaped spores; 2, tripartite *tetraspores,* in definite marginal sori.—CLADHYMENIA (*Harv.*), from *κλαδος, a branch,* and *ὑμην, a membrane.*

Frons membranacea, plana, tenuis, linearis, disticha pinnatifida, e cellulis magnis polygonis granuliferis superficiem versus minutis composita. Fruct.: 1, *ceramidia ovata, fasciculum sporarum pyriformium foventia;* 2, *tetrasporæ triangule divisæ, in soros definitos intramarginales collectæ.*

CLADHYMENIA *conferta;* frond narrow-linear, midribbed, serrulate, twice or thrice pinnatifid; pinnæ and pinnules normally opposite (but by suppression often secund or irregular), oppositely penninerved; the costa vanishing upwards; ceramidia terminating shortened pinnules; sori oblong or linear, intramarginal.

C. conferta; *fronde anguste lineari costata serrulata* 2–3-*pinnatifida; laciniis oppositis (v. sæpe secundis sparsisve) opposite penninerviis; costa sursum evanescente; ceramidiis ramulos abbreviatos terminantibus; soris oblongis v. linearibus intramarginalibus.*

CLADHYMENIA conferta, *Harv. Alg. Austr. Exsic. n.* 245. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 306.

DICTYMENIA conferta, *Harv. Ner. Austr. p.* 29. *t.* 8.

DELESSERIA conferta, *Ag. Sp. Alg. t.* 1. *p.* 177.

FUCUS confertus, *R. Br. in Turn. Hist. t.* 184.

HAB. Kent Islands, *R. Brown.* Port Fairy, *W. H. H.* Georgetown, Tasmania, *R. Gunn, W. H. H.* Southport, *C. Stuart.*

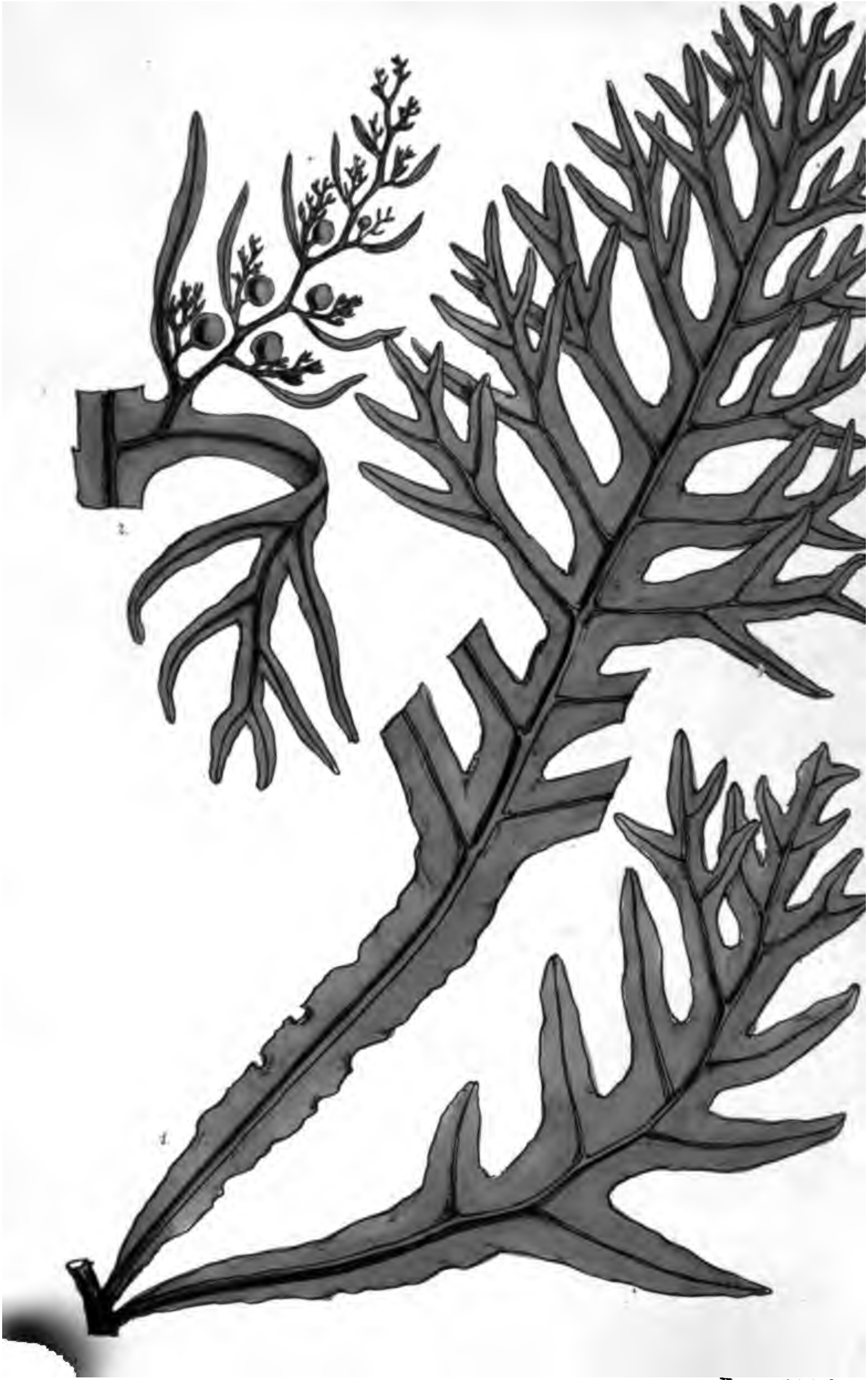
GEOGR. DISTR. South coast of Australia. Tasmania.

DESCR. *Root* minute. *Fronds* densely tufted, 4–6 inches long, 1–2 lines in diameter, delicately membranous, much branched, in every part distichous, repeatedly but rather irregularly pinnatifid. Primary branches one or several inches long, erecto-patent, by suppression often alternate or secund, long and short intermixed, the short simple, the longer once or twice pinnatifid. The main divisions and principal branches are traversed by a strong midrib, which gradually becomes more slender and fainter upwards, and at last almost disappears under the apices of the laciniæ: this rib throws off at short intervals opposite, immersed, patent veins, running straight to the margin, and ending in the marginal indentations. The apices are blunt. The margin is more or less evidently serrulate, never quite entire, but often with obsolete and subdistant toothing. The surface-cellules are very minute. *Ceramidia* oblong-ovate, wide-mouthed, ending in short pinnules; spores large, pedicellate, with distinctly granular endochrome. *Sori* forming long or short lines within the margin of the larger and lesser laciniæ. *Colour* a clear rose-red. *Substance* delicately membranous, but not very soft. In drying the plant adheres, but not very firmly, to paper.

In 'Nereis Australis' the present plant is erroneously referred to *Dictymenia*, as it was formerly, with equal impropriety, referred to *Delesseria*. Both references were made in ignorance of the *fructification*, which, being now discovered, guides us to its true affinities. These are with two New Zealand Algæ, one of them figured in Ner. Austr. (t. 33), the other in Fl. N. Zeal. (t. 113), and both agreeing with the present Alga in general aspect and in fructification, but being less membranous, with thicker intermediate stratum, and wanting the midrib and nerves. Our present plant, therefore, while it may fairly be placed in *Cladhymenia*, will form a subtype in that genus, characterized by the presence of midrib and nerves.

Fig. 1. CLADHYMENIA CONFERTA,—*the natural size*. 2. Apex of a lacinia, bearing *ceramidia*. 3. Spores. 4. Apex, bearing intramarginal *sori*. 5. *Tetraspores*. 6. Fragment of the frond, to show the superficial cellules:—*variously magnified*.

Plate CI



Vincent Brooks Imp.

PLATE CXLV.

SARGASSUM DECURRENS, *Ag.*

GEN. CHAR. *Root* scutate. *Frond* pinnately decompound, with distinct stem, branches, leaves, vesicles, and receptacles. *Vesicles* stipitate, supra-axillary, simple, most frequently mucronate or leaf-bearing. *Receptacles* pod-like, torulose or moniliform, axillary. *Scaphidia* diœcious. *Spores* obovoid.—SARGASSUM (*Ag.*), from the Spanish *sargazo,* a name given by navigators to floating seaweed.

Radix scutata. Frons pinnatim decomposita, caule proprio, ramis, foliis, vesiculis, receptaculisque donata. Vesiculæ stipitatæ, supra-axillares, simplices, sæpissime mucronatæ v. foliiferæ. Receptacula siliquæformia, torulosa v. nodulosa, axillaria. Scaphidia dioica. Sporæ obovoideæ.

SARGASSUM *decurrens;* frond flat, foliaceous, ribbed, distichously pinnate; pinnæ pinnatifid, their segments linear, entire, ribbed, taper-pointed; vesicles numerous (on the fertile branches), spherical, pointless; receptacles cylindrical, unarmed, in a panicle equalling the pinna; each branchlet subtended by a linear floral leaf.

S. decurrens; *fronde plana foliacea costata disticke pinnata; pinnis pinnatifidis; laciniis linearibus integerrimis costatis apice acuminatis; vesiculis numerosis sphæricis muticis; receptaculis cylindraceis, inermibus, in paniculam folium æquantem dispositis; pedicellis folio florali lineari fulcratis.*

SARGASSUM decurrens, *Ag. Sp. p.* 42; *Syst.* 308. *J. Ag. Sp. Alg. v.* 1. *p.* 285. *Harv. Alg. Austr. Exsic. n.* 17.

PTEROCAULON decurrens, *Kütz. Sp. Alg. p.* 606; *Phyc. Gen. p.* 360.

·FUCUS decurrens, *R. Br. MS. in Turn. Hist. t.* 194.

HAB. North shores of New Holland, *R. Brown.* Torres Straits, *Herb. Aresch.* (*fide J. Ag.*). Australia, *Miss Anne Taylor.* Rottnest Island, *W. H. H.*

GEOGR. DISTR. Northern and western coasts of Australia.

DESCR. *Root* discoid. *Fronds* rising with a short, compressed or winged *stem,* which divides near the base into several branches. *Branches* 12–15 inches long, or perhaps more, flat and leafy, traversed by a strong midrib, linear, naked below, but from the middle to the extremity closely and distichously pinnated. *Pinnæ* flat, and midribbed like the primary branch, patent, pinnatifid at or near the extremity; the ultimate laciniæ narrow and taper-pointed. In young specimens the branch is ½ inch wide, the pinnæ 4–5 lines, the pinnules 1–2 lines wide; in the older frond the laciniæ are much narrower and more attenuate. *Vesicles* are only found on the inflorescence; they are globose, pointless, 2–2½ lines in diameter, on very short stalks.

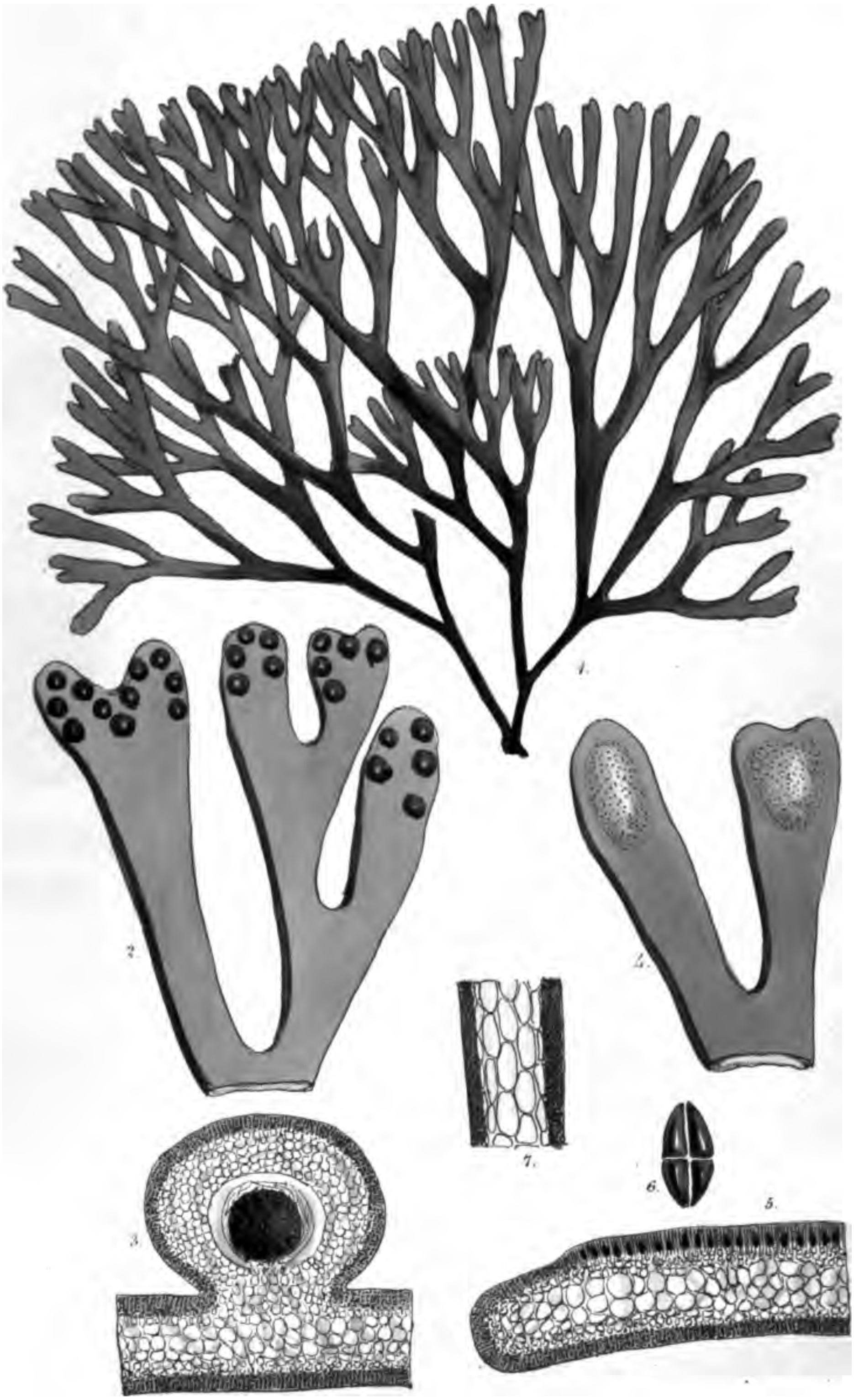
The *receptacles* are borne on a panicled fruit-branch, 2–3 inches long, flexuous and alternately branched, issuing from the axil of the pinnæ, in fertile fronds; each receptacle is 1–2 lines long, simple or forked, and they form short, lateral racemes on the panicle, each subtended by a small, linear *bract* and a *vesicle*. The *colour* of the frond is an olive-brown. The *substance* is coriaceous and tough.

A rare and not much known species, of which I collected very few specimens, and these only in a young state, without vesicles or fruit. For the only fruiting specimen I possess I am indebted to the kindness of the late Miss Anne Taylor, of Clonmel, who did not know from what district of Australia it had been sent.

S. decurrens belongs to a small group of *Sargassa* distinguished by the union of leaf and stem, by means of the decurrent membrane, into a compound frond or *phyllocladium*. The species so organized have the habit of *Fucus*, combined with the inflorescence of *Sargassum*. Two other species, *S. Peronii* and *S. Boryi*, both from Western Australia, have this character.

Fig. 1. SARGASSUM DECURRENS, two branches from a young frond. 2. A pinna, with its axillary *panicle* of receptacles and vesicles, from an adult frond:—both of *the natural size*.

Plate CXLVI.



Vincent Brooks, Imp.

PLATE CXLVI.

RHODYMENIA AUSTRALIS, *Sond.*

GEN. CHAR. *Frond* flat, membranous, dichotomous or palmate, composed of two strata of cells; the *medullary* stratum of oblong, polygonal, larger cells; the *cortical* of minute, vertically seriated cellules. *Fructification:* 1, sessile, hemispherical, thick-walled *conceptacles*, at length opening by a terminal pore, containing densely-packed, sporiferous filaments issuing from a basal placenta, and surrounded by a gelatinous pellicle; 2, cruciate or tripartite *tetraspores*, either scattered over the frond, collected in *sori*, or immersed in terminal, shield-like *nemathecia*.—RHODYMENIA (*Grev.*), from ῥοδεος, *red*, and ὑμην, *a membrane.*

Frons plana, membranacea, dichotoma v. palmata, stratis duobus composita; strato medullari ex cellulis majusculis oblongis polyhedris, corticali cellulis minimis coloratis pluriserialibus conflato. Fruct.: 1, *cystocarpia sessilia, hemisphærica, intra pericarpium crassum demum carpostomio apertum fila sporifera densissime aggregata, e placenta basali emissa, pelliculâ gelatinoso-cellulosâ velata foventia;* 2, *tetrasporæ cruciatim v. triangule divisæ, nunc sparsæ, nunc in soros subdefinitos collectæ v. in nematheciis terminalibus immersæ.*

RHODYMENIA *australis;* frond stipitate, narrow-linear, many times dichotomous, fastigiate, submarginate, or canaliculate; segments suberect, with narrow axils; apices abrupt or emarginate; conceptacles crowded round the ends of the branches; tetraspores cruciate, vertically lodged in subterminal nemathecia.

R. australis; *fronde stipitata angusto-lineari pluries dichotoma fastigiata submarginata v. canaliculata; laciniis suberectis axillis angustis apicibus subtruncatis v. emarginatis; cystocarpiis circa apices laciniarum congregatis valde convexis; tetrasporis cruciatis in nematheciis subterminalibus immersis.*

RHODYMENIA australis, *Sond. Bot. Zeit.* 1845, *p.* 55. *Pl. Preiss. v.* 2. *p.* 191. *Harv. in Trans. R. I. Acad. v.* 22. *p.* 554; *Alg. Exsic. Austr. n.* 380.

ACROPELTIS australis, *J. Ag. Sp. Alg. v.* 2. *p.* 609.

SPHÆROCOCCUS australis, *Kütz. Sp. Alg. p.* 784.

HAB. Western Australia, *Preiss.* Abundant at Rottnest Island, near Fremantle, *W. H. H. G. Clifton.*

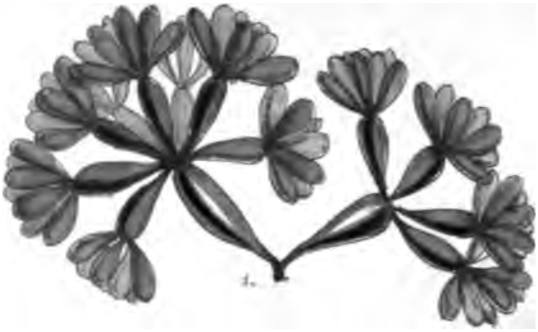
GEOGR. DISTR. Western Australia.

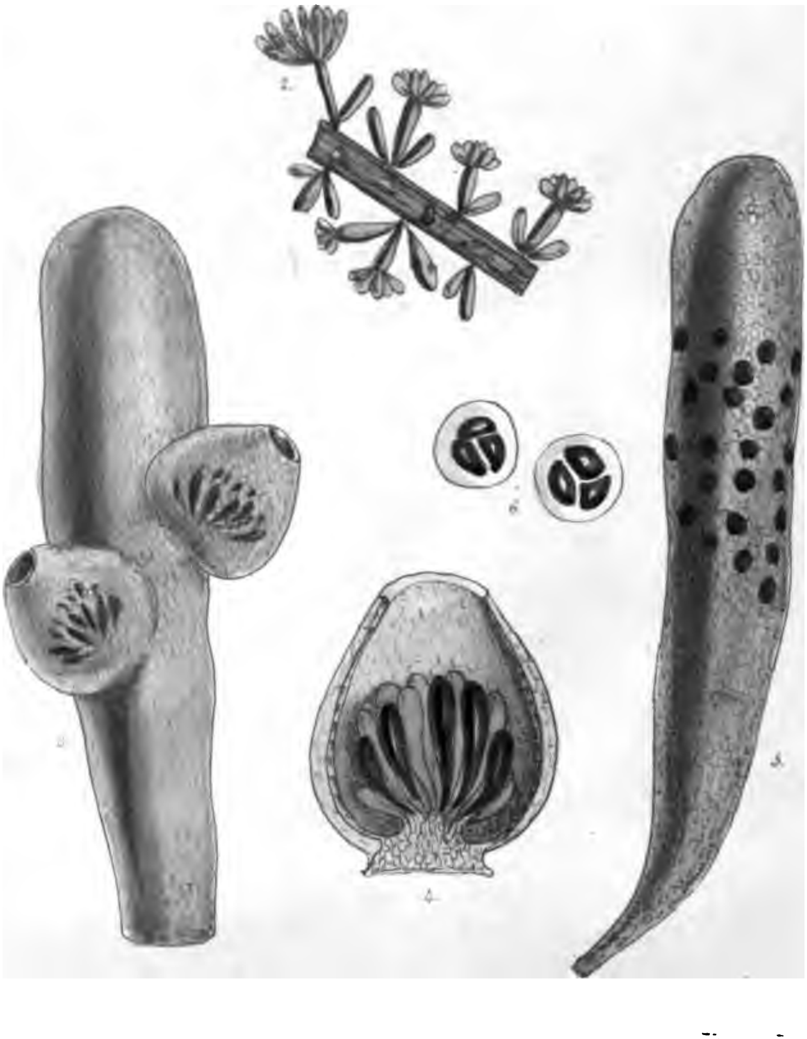
DESCR. *Root* discoid. *Stem* 1–2 inches long, firmly cartilaginous or horny, ½ line in diameter, forking or breaking up into several branches, each of which terminates in a dichotomous frond. *Fronds* (secondary) subflabelliform, fastigiate, many times dichotomous, with narrow, but rounded axils, and erect or suberect laciniæ. Laciniæ linear, 1½–2 lines wide, truncate or emarginate, slightly thickened at the margin, and more or less concave or subcanaliculate on one side. *Cystocarps* very convex, constricted at base, several clustered round the apex, as large as poppy-seed, dark-red, with a very thick pericarp and densely compacted nucleus. *Tetraspores* lodged in shield-like, flat *nemathecia*, placed immediately under the slightly dilated apices, cruciate, vertical. *Substance* of the frond rather rigid and thick; central cellules large and in few rows. The *colour* is a full and rather dark red, becoming brownish in drying. The frond shrinks in drying, and imperfectly adheres to paper.

This species is placed by J. Agardh in *Acropeltis*, of which it certainly has the tetrasporic fruit; but the structure of frond, and general habit, are those of *Rhodymenia*. The cystocarpic fruit of *Acropeltis* being unknown, it is premature to say whether it has good claims to be kept up as a genus or not. But for the nature of its medullary layer, there seems nothing to prevent its being referred to *Rhodymenia*.

The present species is very common at Rottnest Island, but has not yet been found on other parts of the Australian coasts. Another species, erroneously referred by me to *R. corallina*, and which seems very near *R. Palmetta*, is abundant in several places, from one end of the Australian continent to the other.

Fig. 1. RHODYMENIA AUSTRALIS,—*the natural size*. 2. Apices, bearing cystocarps. 3. Vertical section of a cystocarp. 4. Apices, bearing *nemathecia*. 5. Cross section of lamina and *nemathecium*. 6. A tetraspore. 7. Longitudinal section of lamina; the latter figures variously *magnified*.





Vincent Brooks Imp.

PLATE CXLVII.

CHONDRIA UMBELLULA, *Harv.*

GEN. CHAR. *Frond* filiform, cartilaginous, dendroid, opaque, coated with small, polygonal, irregularly placed cells. *Axis* articulated, polysiphonous. *Ramuli* clavæform, much constricted at their insertion. *Fructification:* 1, ovate *ceramidia;* 2, tripartite *tetraspores,* formed irregularly, in the clavate ramuli.—CHONDRIA, (*Ag.*), *χονδρος, cartilage.*

Frons filiformis, cartilaginea, dendroidea, opaca, cellulis irregularibus polygonis corticata. Axis articulatus, polysiphonus. Ramuli clavati, basi constricti. Fruct.: 1, *ceramidia ovata;* 2, *tetrasporæ triangule divisæ, in ramulis immersæ, sparsæ v. irregulariter aggregatæ.*

CHONDRIA *Umbellula;* frond dwarf, saccato-clavate, subsimple, once or twice umbellate; ramuli, 5-10 in each umbel or umbellule, clavate, very obtuse; conceptacles ovate, constricted at base, sessile; tetraspores scattered.

Ch. Umbellula; *fronde pusilla saccato-clavata subsimplici semel v. iterum umbellata; ramulis* 5–10 *in umbella v. umbellulis clavatis obtusissimis ceramidiis, ovatis basi constrictis sessilibus; tetrasporis sparsis.*

CHONDRIA Umbellula, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 539; *Alg. Austr. Exsic. n.* 161.

HAB. Rottnest Island, on *Zostera, W. H. H.* Garden Island, on the smaller Algæ, *G. Clifton.*

GEOGR. DISTR. Western Australia.

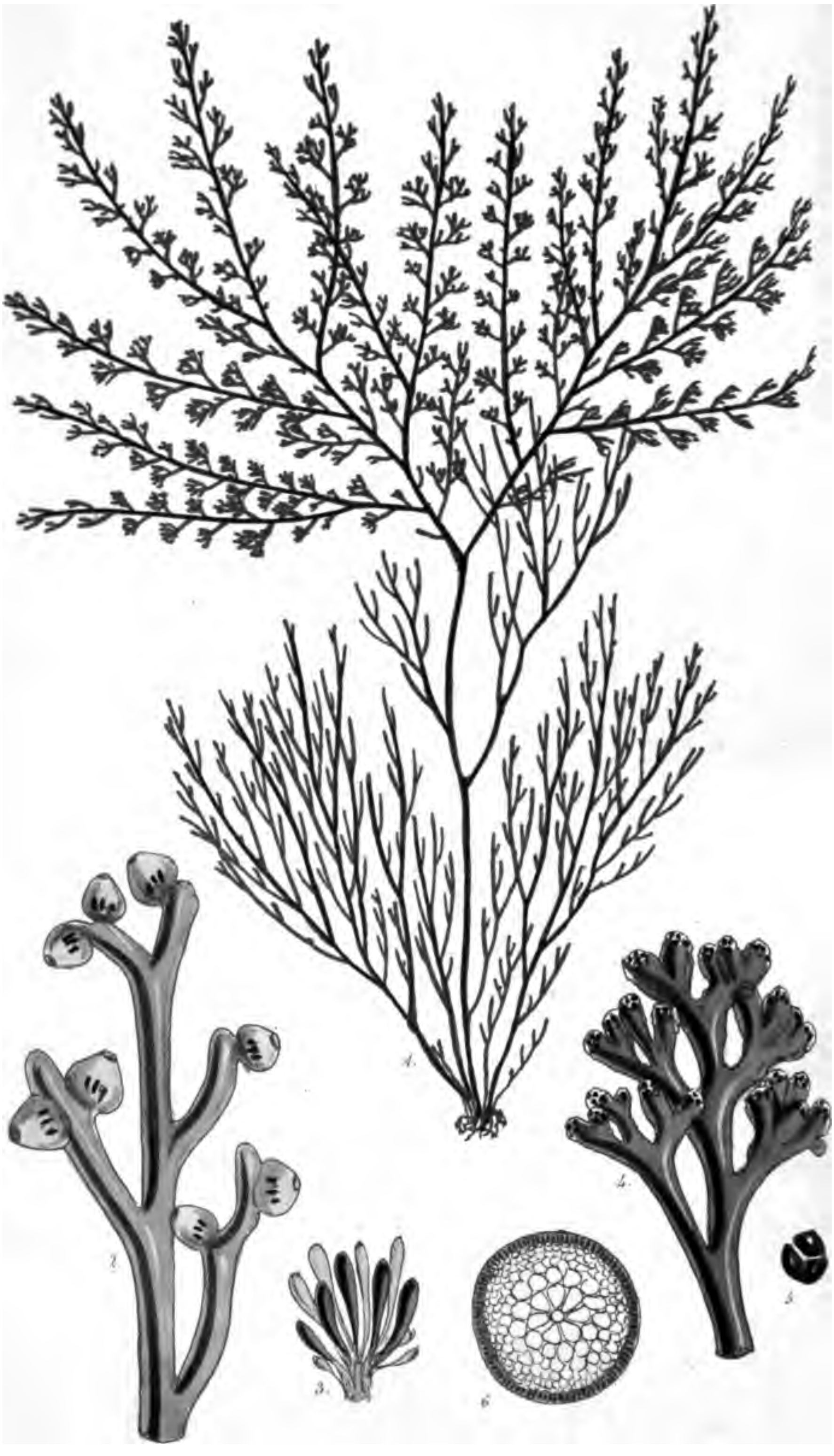
DESCR. *Root* discoid. *Fronds* solitary or tufted, ½–1 inch long, linear, clavate, crowned with an umbel of 5–10 or more ramuli of similar shape to the primary frond; sometimes never becoming more branched, and sometimes throwing out from the apices of the umbellate ramuli a secondary umbel of similar character; and again, in very luxuriant specimens, *tertiary* umbellules from the tip of each secondary ramulus. It is possible that the frond may continue to extend by further repetitions of this mode of branching. All the internodes and ramuli are clavæform, very obtuse, cylindrical, succulent, ½–1½ lines in diameter. *Fruit* of both kinds is found on the smaller and simpler as well as on the larger and more compound individuals. The conceptacles are quite sessile, broadly ovate, with large apertures, thin-walled, and containing a dense tuft of linear-clavate spores. The *tetraspores* are scattered in the substance of the ramuli below the apex, and are surrounded each by a very broad hyaline limbus. The colour is a purplish or a pinkish red, soon discharged, and varying in intensity in different specimens. The

substance is soft, flaccid, and juicy, and the frond adheres very closely to paper in drying.

A very pretty and distinctly marked, though small species. Our Figures 1 and 2, both of the natural size, and both full-grown and in fruit, differ remarkably in luxuriance, but in no other character; and offer another instance, in addition to that stated under Plate LII., of the freer growth of Algæ from Garden Island, compared with those from Rottnest. Many more instances might be given; and I have been at a loss whether to account for the increased development by the different position of the two islands—which are only a few miles apart—or by the difference of *parasitism*. The *dwarf* plants generally grow on *Zostera*, the larger on some of the smaller Algæ. Whether the fact of growing on a flowering sea-plant has any influence on the Alga is uncertain. If it have, one might infer that the *root* of Algæ was a more active organ than is commonly supposed.

Fig. 1. CHONDRIA UMBELLULA (from Garden Island). 2. The same (from Rottnest):—both of *the natural size*. Fig. 3. Apex of a ramulus, with *conceptacles*. 4. Vertical section of a conceptacle. 5. A ramulus, with *tetraspores*. 6. Tetraspores:—the latter figures *magnified*.

Plate CXLVIII.



Vincent Brooks Imp

PLATE CXLVIII.

LAURENCIA HETEROCLADA, *Harv.*

GEN. CHAR. *Frond* cylindrical or plano-compressed, linear, pinnately-branched, cartilaginous, the apices obtuse, composed of two strata of cells; the *inner* of oblong, angular cells, shorter toward the circumference; the *outer* of small, roundish-angular cellules. *Fruit:* 1, ovate, sessile *ceramidia,* containing a tuft of pear-shaped spores; 2, tripartite *tetraspores,* imbedded, without order, beneath the tips of the ramuli.—LAURENCIA (*Lamour.*), in honour of M. De la Laurencie, a French naturalist.

Frons teretiuscula v. plano-compressa, linearis, pinnato-ramosa, cartilaginea, apicibus obtusis, ex stratis duobus contexta, strato medullari ex cellulis oblongis extus sensim brevioribus, corticali ex cellulis minoribus rotundo-angulatis coloratis. Fruct.: 1, *ceramidia ovata, sessilia, intra pericarpium crassiusculum fasciculum sporarum pyriformium foventia;* 2, *tetrasporæ triangule divisæ, infra apicem ramulorum sine ordine immersæ.*

LAURENCIA *heteroclada;* densely tufted, springing from creeping shoots; frond livid-purple, terete, rigid, tough, the younger many times secundly branched, with very erect branches and branchlets and very narrow axils; the adult panicled above, the branches issuing toward every side, long and spreading; ramuli alternate, spirally inserted, corymbose, multifid; ceramidia ovate, sessile; tetraspores apical, in short, swollen ramuli.

L. heteroclada; *densissime cæspitosa, e surculis repentibus orta; fronde livido-purpurea tereti rigida tenaci, juniori pluries secunde v. subsecunde ramosa; ramis ramulisque erecto-appressis axillis angustissimis; adulta apice paniculata, ramis quoquoversum egredientibus elongatis patentibus; ramulis alternis spiraliter insertis corymboso-multifidis; ceramidiis ovatis sessilibus; tetrasporis in apicibus incrassatis ramulorum immersis.*

LAURENCIA heteroclada, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 544; *Alg. Exsic. Austr. n.* 234.

HAB. Covering the exposed edges of reefs at low water-mark, spreading continuously over wide spaces. Rottnest Island, *W. H. H.* Fremantle, *G. Clifton.* Port Fairy, Cape Riche, and Western Port, *W. H. H.*

GEOGR. DISTR. Western and southern coasts of Australia.

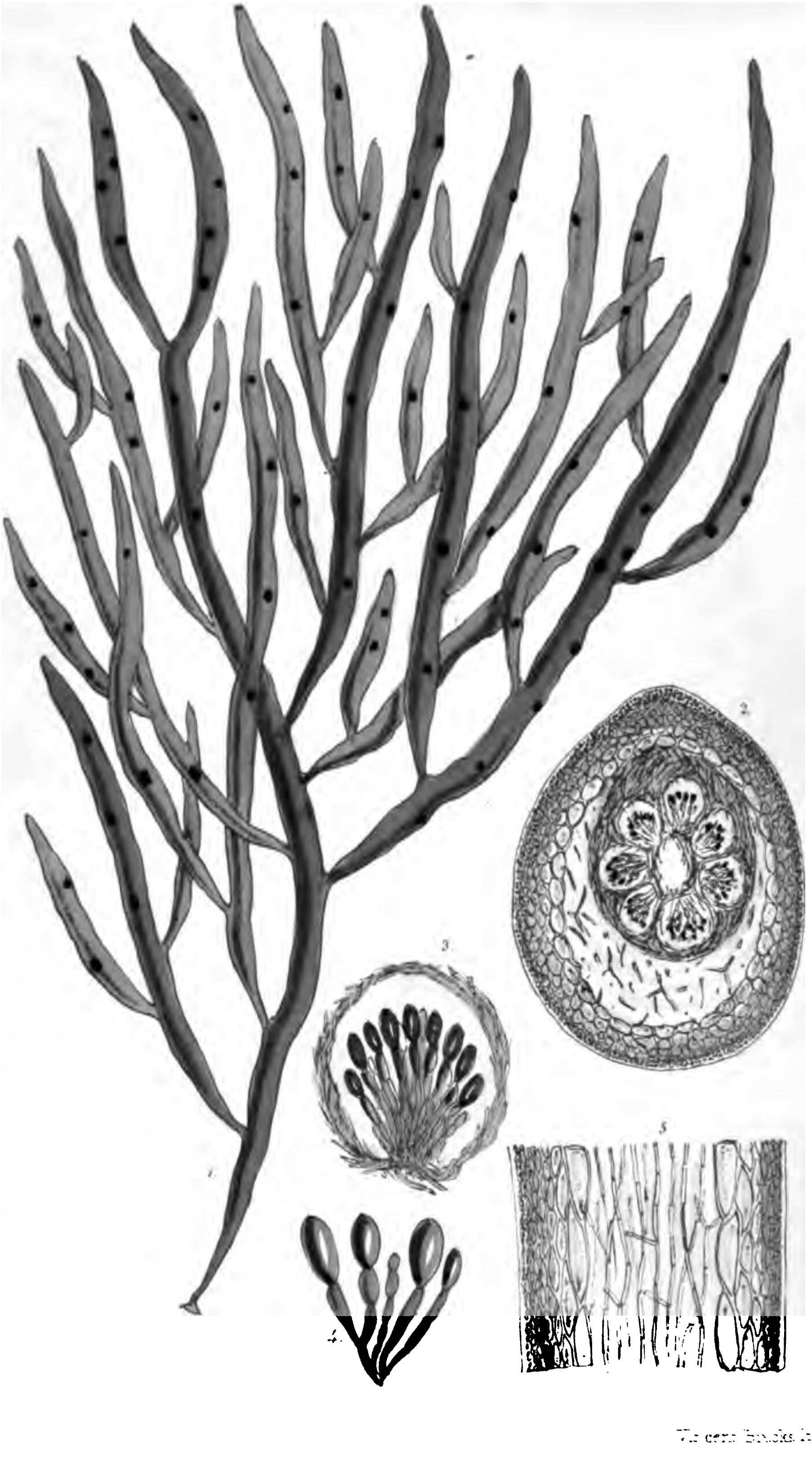
DESCR. *Roots* forming a continuous mass of creeping interwoven fibres, spreading over large spaces. *Fronds* densely tufted, 4–8 inches high, rather thicker than hog's-bristle, cylindrical, very rigid and tough. The young, immature fronds, 2–8 inches in height, are closely set with lateral, generally

secund, sometimes alternate branches, which are once or twice similarly branched, all the branches and ramuli being very straight and erect, filiform, with very narrow axils. The mature frond is more stipitate, and its upper branches become panicled or dendroid, dividing into many virgate and subpatent secondary branches, which are set throughout with short, multifid, corymbose ramuli. The *ceramidia* are ovate, sessile, and borne toward the end of the branches, on specimens which, though much divided, are not furnished with the corymbose ultimate ramuli; they contain a tuft of linear clavate spores. The *tetraspores* are in the tips of the corymbose ramuli, very few in each tip, which is then somewhat swollen or distorted. The *colour* is a very dark purple or brownish, becoming darker in drying, but after exposure or long steeping in fresh-water, it becomes more red. The *substance* is very rigid and wiry, and in drying the frond very imperfectly adheres to paper.

This wiry species grows in situations where it is exposed to the full dash of a pretty constantly boisterous surf, and where few other Algæ compete with it in "the struggle for life." Its matted roots take very firm hold on the rock, and it spreads in patches of many yards in length, or else borders the thin edge of the reef for a much greater extent. The young plants are remarkably different from the mature,—so much so, that, if separated, they might pass for different species. The cystocarpic and tetrasporic plants also differ in ramification, as takes place sometimes with other species, and adds greatly to the difficulty of distinguishing one from another. I fear the *species* of *Laurencia* have been too much multiplied.

Fig. 1. LAURENCIA HETEROCLADA,—*the natural size.* 2. Branch, with ceramidia. 3. Tuft of spores. 4. Branchlet, with *tetraspores* in the tips. 5. A tetraspore. 6. Cross section of the stem :—the latter figures variously *magnified.*

Plate CXLI.



Vincent Brooks Imp.

Plate CXLIX.

SOLIERIA AUSTRALIS, *Harv.*

Gen. Char. *Frond* cylindrical, dendroid, formed of three strata; the *medullary* of longitudinal, anastomosing filaments; the *intermediate*, of several rows of angular oblong cellules; the *cortical* of 2–3 rows of minute, coloured cellules. *Fructification:* 1, *conceptacles* immersed in the medullary region, the walls formed of a dense plexus of filaments; *placenta* fibrocellular, central (often at length hollow), suspended in the cavity by fibrous emanations from the walls; *spores* pedicellate, pyriform or ellipsoidal, emitted in fascicles from the placenta; 2, zonate *tetraspores*, dispersed among the cortical cellules.—Solieria (*J. Ag.*), in honour of *M. Solier*, a distinguished French naturalist and algologist.

Frons teres, dendroidea, stratis tribus formata; strato medullari ex filis longitudinalibus anastomosantibus, intermedio cellulis oblongis angulatis pluriseriatis, corticali cellulis minimis 2–3-*seriatis coloratis formato. Fruct.:* 1, *cystocarpia in strato medullari omnino immersa, pericarpio fibroso induta; placenta fibro-cellulari centrali in cavitate pericarpii funiculis suspensa, sporas pedicellatas pyriformes v. ellipsoideas fasciculatas emittente;* 2, *tetrasporæ zonatim divisæ, sparsæ.*

Solieria *australis;* frond dendroid (1–2 feet high), robust, excessively branched; branches alternate or scattered, near together, many times alternately compounded; ultimate branchlets (1–2 inches long) linear, acute, much attenuate at base, cystocarps half-immersed in the branchlets.

S. australis; *fronde dendroidea* (1–2-*pedali*) *robusta decomposito-ramosissima; ramis alternis sparsisve approximatis pluries alterne compositis; ramulis ultimis* (1–2-*uncialibus*) *linearibus acutis basi valde attenuatis; cystocarpiis in ramulis semi-immersis.*

Solieria australis, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 552; *Alg. Austr. Exsic. n.* 346. *Harv. in Hook. fil. Fl. Tasm. v.* 2. *p.* 316.

Hab. Fremantle, abundantly, *W. H. H., G. Clifton.* King George's Sound; and at Georgetown, Tasmania, *W. H. H.*

Geogr. Distr. Western and southern coasts of Australia. Tasmania.

Descr. *Root* a small conical disc. *Fronds* solitary or tufted, 1–2 feet long, 1½–3 lines in diameter, cylindrical, excessively branched, and bushy. *Primary branches* spreading to all sides, inserted without order, closely placed, patent or erecto-patent, a foot or more in length, alternately once, twice, or several times decompound. All the divisions taper to the base, sometimes at their insertion being only of setaceous thickness; all are acute, but rarely acuminate at the extremity. The ultimate ramuli are 1–2 inches long, generally very erect, with narrow axils. *Cystocarps* are plentifully scattered over the branches and ramuli, in the substance of which they are fully immersed, but rather prominent towards one side, and in the dried specimen project from the edges of the branch, like small conical pustules. The *spores* are often two or three in a string on the spore-thread, and are more oval than in *S. chordalis*. The *colour* is a full, deep-red, becoming rather darker in drying, and, if not steeped in fresh-water for some time, the specimens will stain the paper *brown* on which they are displayed. The *substance* is fleshy and succulent, soft and flexible, and in drying the frond adheres closely to paper.

This genus agrees with *Rhabdonia* both in habit and in the structure of the frond, and differs merely in the structure of the cystocarp; but so essentially as to compel us to refer these genera to different families. The present species is much larger and more robust than *S. chordalis*, but in other respects very similar to it. The ramuli, however, are much less taper-pointed, and the spores are of a somewhat different form. It abounds at Fremantle, after severe winter gales, and seems to come up from deep water.

Fig 1. SOLIERIA AUSTRALIS; a *young* plant,—*the natural size*. 2. Transverse section of a branch, with an immersed *conceptacle*. 3. Portion of the placenta, with a tuft of spore-threads. 4. Spore-threads. 5. Longitudinal section of a branch:—the latter figures *magnified*.

Pla.

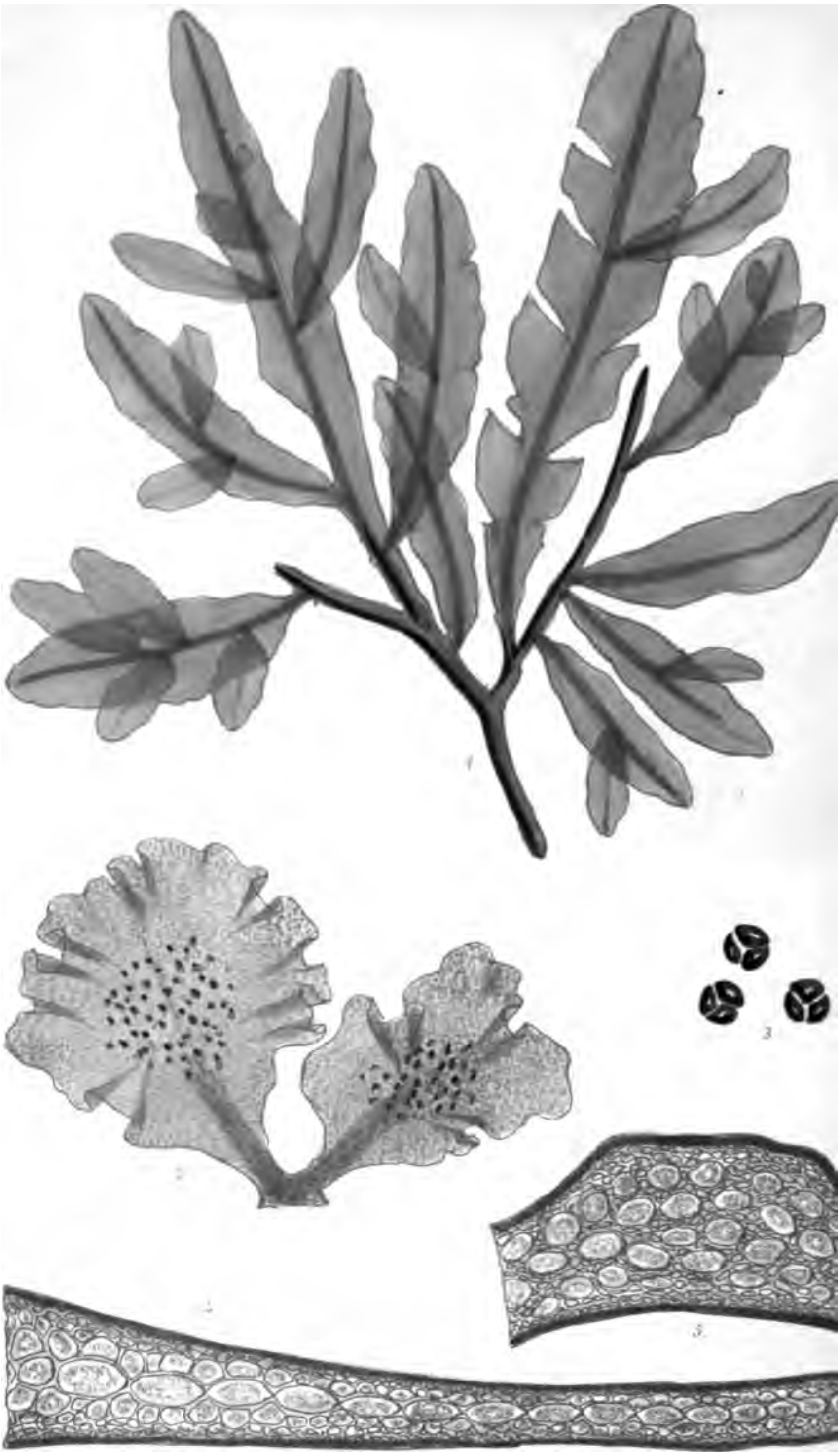


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Plate CL.

DELESSERIA CORIIFOLIA, *Harv.*

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len. Char. *Frond* leaf-like, membranaceous, areolated, symmetrical, simple or branched, midribbed. *Fructification:* 1, hemispherical *conceptacles,* sessile on the midrib, or on a lateral nerve, containing a tuft of moniliform spore-threads on a basal placenta; 2, tripartite *tetraspores,* in definite *sori* or spots, on the frond, or on accessory leaflets.—**Delesseria** (*Ag.*), in honour of Baron Delessert, a distinguished patron of botany.

Frons foliacea, membranacea, areolata, symmetrica, simplex v. ramosa, costata. Fruct.: 1, *coccidia in costa venisque frondis sessilia, hemisphærica, fila sporifera moniliformia a placenta basali emissa foventia:* 2, *tetrasporæ triangule divisæ, in soros definitos collectæ.*

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elesseria *coriifolia;* frond midribbed, becoming branched by leaflets springing from the thick midrib; leaflets cartilagineo-carnose, thick, opaque, lanceolate, obtuse; membrane formed of several rows of polyhedral cells, the innermost large, the cortical very minute; cystocarps and sori respectively borne on proper fruit-leaflets emitted by the midribs.

D. coriifolia; *fronde costata foliolis a costa crassa prorumpentibus ramosa; foliolis cartilagineo-carnosis crassis opacis lanceolatis obtusis; membranæ cellulis pluriserialibus, interioribus magnis polyhedris, corticalibus minutissimis; cystocarpiis sorisque in sporophyllis propriis e costa enatis.*

Delesseria coriifolia, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 548; *Alg. Austr. Exsic. n.* 273.

Lab. Garden Island and Rottnest, Western Australia, *W. H. H., G. Clifton.*

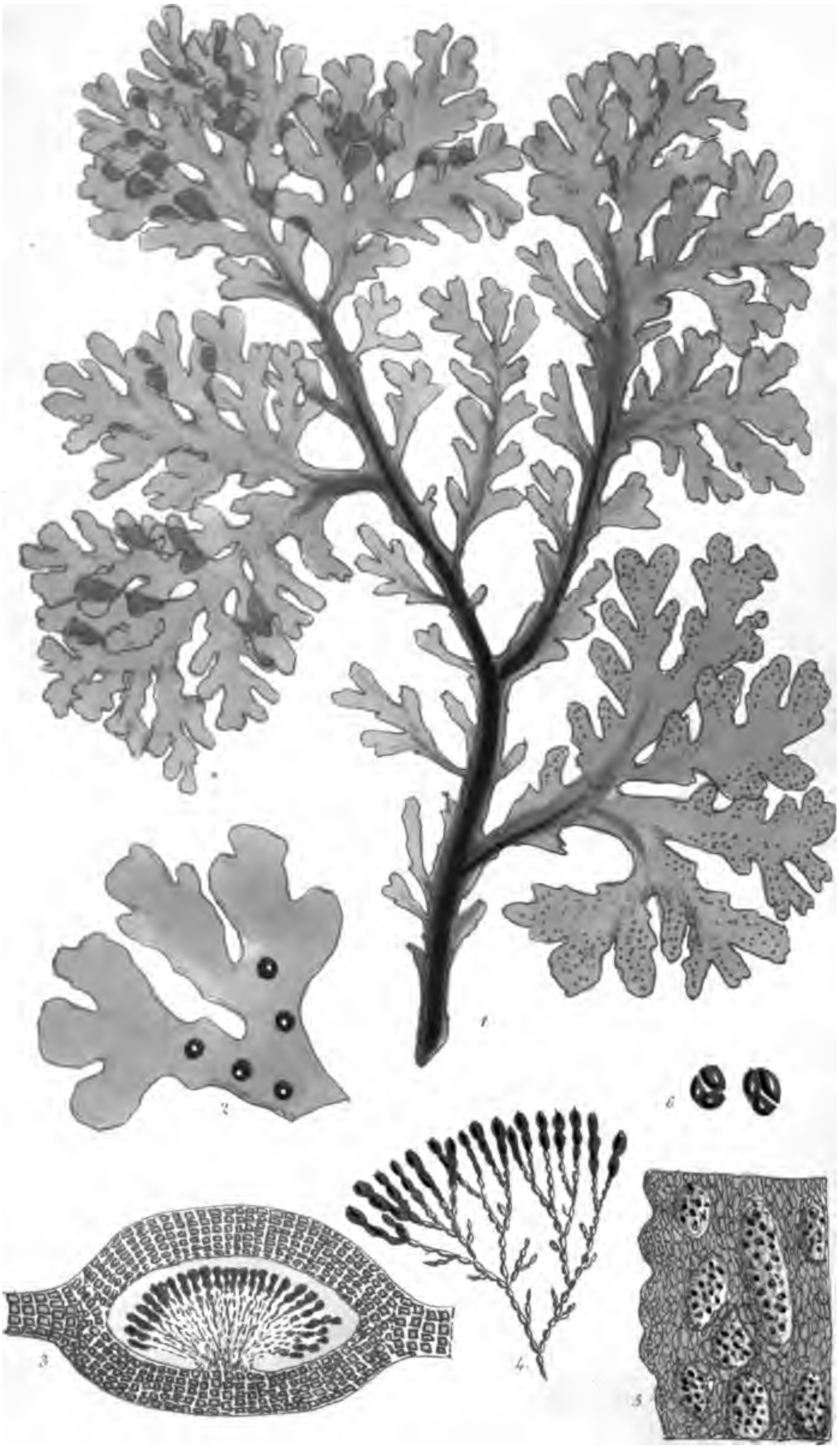
eogr. Distr. Western Australia.

escr. *Root* discoid. *Frond* at first consisting of a linear-oblong or sublanceolate, midribbed leaf, which on the decay of the lamina and thickening of the rib, is gradually changed into a compressed, or imperfectly winged stem. This primary frond emits numerous similar leaves, which issue irregularly from the thick midrib, and in their turn emit secondary and often tertiary similar but smaller leaflets. The larger leaves are 3–5 inches long, ½–¾ inch wide, either blunt at base or tapering, and usually very blunt at the apex. The *substance* is thick, leathery when fresh, rigid when dry, and the membrane is composed of several rows of irregularly polyhedral cellules, all filled with granular matter, and the outer ones deeply coloured. The central cellules are of large size, in a single row in the lamina, and in several rows in and about the midrib; the intermediate and cortical cells are much smaller, irregularly placed, and gradually become smaller to the surface. The fruit-leaflets or *sporophylla* are very small, obovate, undulate, thin in substance, and imperfectly ribbed; they are found on the midribs of the smaller leaves, and contain either *cystocarps* or a *sorus* of *tetraspores*. The *colour* is a full dark-red or blood-colour, and becomes rather deeper in drying. The frond very imperfectly adheres to paper in drying.

The structure of the membrane in this species is different from that in most others of the genus, with the exception of *D. Hookeri* and perhaps *D. Middendorfii*, to both which it seems to be allied, though very distinct from either. If difference in cellular structure be alone a sufficient ground for distinguishing genera among the Algæ, these three species might be separated as a genus; as it is, they form a natural section.

An imperfect specimen of this plant, sent by Mr. Mylne from Australia, and given to me by the late Dr. Lemann, is described in Ner. Austr. p. 21, under *Sarcomenia delesserioides*, to which I doubtfully referred it. The two plants have a very similar habit, and not a very different structure; but their fructification is quite different: as may be seen by comparing the pod-like, tetraspore-bearing fruit of *Sarcomenia* (Plate CXXI.) with the broad fruit-leaves of our present Plate.

Fig. 1. DELESSERIA CORIIFOLIA,—*the natural size.* 2. *Sporophylla*, containing *tetraspores*. 3. Some *tetraspores*. 4. Semisection of the lamina in a small leaf. 5. Section at the midrib, in the same; the latter figures *variously magnified.*



Vincent Brooks Imp.

Plate CLI.

NITOPHYLLUM CURDIEANUM, *Harv.*

Gen. Char. *Frond* membranaceous, expanded, areolate, unsymmetrical, nerveless or irregularly veined. *Fructification:* 1, hemispherical *conceptacles,* sessile on the frond, containing a tuft of moniliform spore-threads, on a basal placenta; 2, tripartite *tetraspores,* in definite sori or spots, scattered, or confined to some part of the frond.—Nitophyllum (*Grev.*), from *nitor,* 'to shine,' and *φυλλον, a leaf.*

Frons membranacea, expansa, areolata, vage fissa, enervia v. basi venulis irregularibus peragrata. Fruct.: 1, *coccidia frondi sessilia, hemisphærica, fila sporifera moniliformia a placenta basali emissa foventia;* 2, *tetrasporæ triangule divisæ, in soros definitos collectæ.*

Nitophyllum *Curdieanum;* stipes elongate, strongly ribbed, winged or two-edged, branched; branches prolonged into lateral or terminal, nerveless or basally nerved, irregularly pinnatifid and lobulate, cuneato-flabelliform segments; axils very narrow; apices obtuse; membrane rigid, papery, composed of several rows of cells; cystocarps globose, scattered; sori minute, oblong or linear, crowded in the ultimate segments and lobes.

N. Curdieanum; *stipite elongato valide costato alato v. ancipite ramoso; ramis in segmenta cuneato-flabelliformia lateralia v. terminalia vage pinnatifida et lobulata enervia v. basi nervosa productis; axillis angustis, apicibus obtusis, margine integerrimo, membrana stratis pluribus cellularum constituta; cystocarpiis globosis sparsis, soris minutis oblongis v. linearibus densissima in lacinulis ultimis aggregatis.*

Nitophyllum Curdieannm, *Harv. Alg. Austr. Exsic. n.* 291.

Hab. South Australia, *Dr. Curdie.* Port Fairy, *W. H. H.*

Geogr. Distr. Southern coasts of Australia.

Descr. *Root* discoid. *Fronds* tufted, 6–12 inches long, flabelliform in general outline, much branched and divided. The adult frond has generally a leading stem several inches long, 2–4 lines wide, winged with torn membrane, strongly ribbed, branching alternately or dichotomously, and often emitting throughout its whole length crowded, proliferous segments. The branches terminate also in segments similar to those of the stem: these are deeply cut, generally in a pinnate, sometimes in a dichotomous order; the divisions are either linear or very narrow-cuneate, flat or slightly wavy, the the lower ones with a vanishing nerve, the upper quite nerveless. All the apices are blunt. The membrane of the frond is decidedly rigid, composed of 4–5 rows of quadrate cells. *Cystocarps,* the size of poppy-seeds, are

scattered over the principal segments. The *sori* are very small, and crowded in the ultimate segments. The older parts of the frond are a dark brown-red, the younger pinky; all become darker, and sometimes very dark, in drying. The frond very imperfectly, and with difficulty adheres to paper in drying. The *spore-threads* are very much branched.

* * *

This species is nearly allied to *N. affine*, as a variety of which I formerly regarded it, but have been induced to separate it specifically on account of its very rigid substance. *N. affine* is delicately thin, and closely adheres to paper. This is also darker in colour; and but for its much divided and deeply cut frond would come near *N. Gunnianum.*

The first specimens I received of it were in a parcel sent to me in 1851 by Dr. Curdie, of Geelong, to whom this species is dedicated.

Fig. 1. NITOPHYLLUM CURDIEANUM,—*the natural size.* 2. A fragment of a segment, bearing cystocarps,—*slightly enlarged.* 3. Section through a cystocarp. 4. Spore-thread. 5. Frustule, with sori. 6. Tetraspores,—variously *magnified.*

Plate

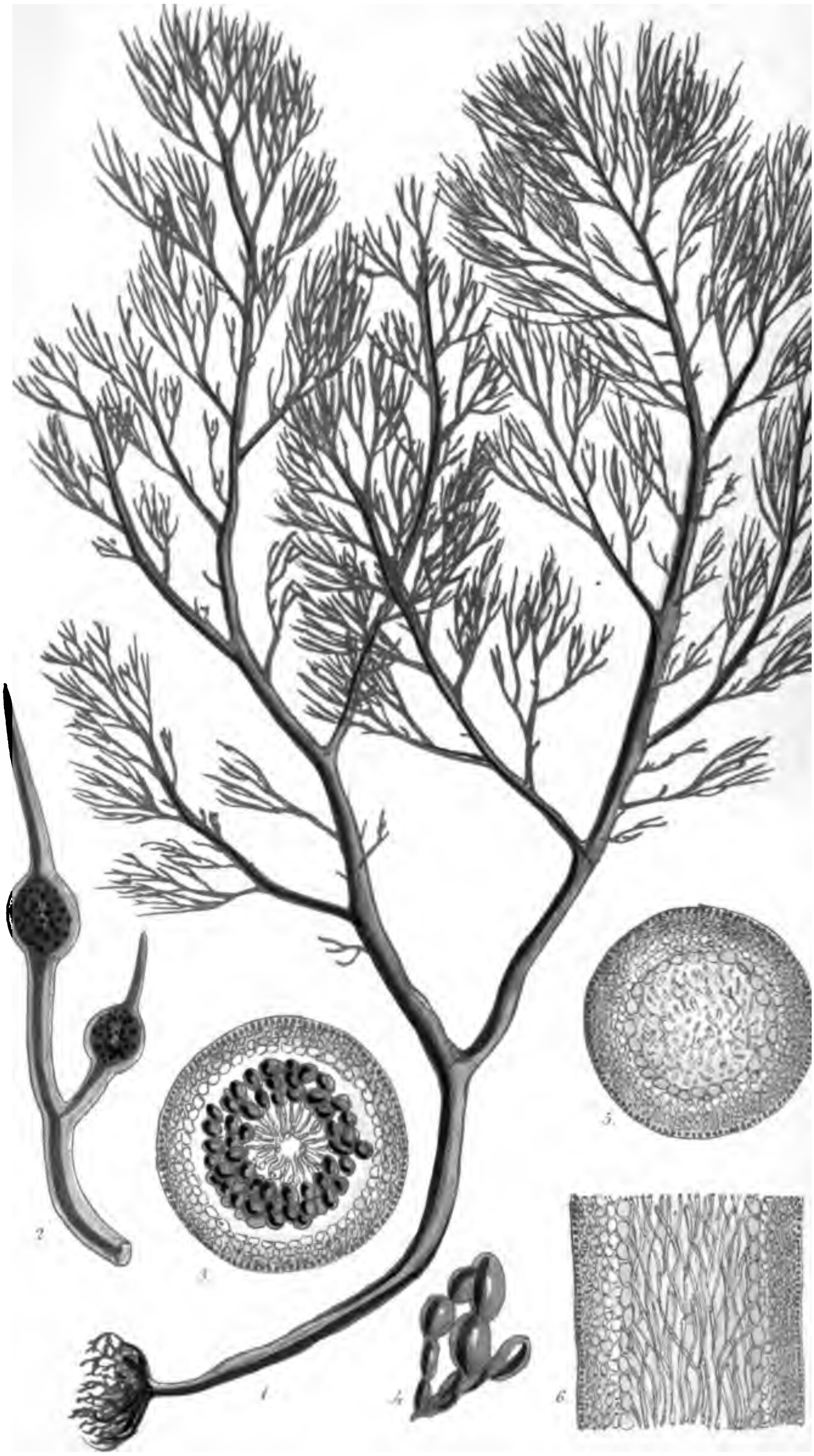


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Plate CLII.

RHABDONIA DENDROIDES, *Harv.*

Gen. Char. *Frond* filiform, decompound, imperfectly tubular; tube partly filled with longitudinal, branching and anastomosing filaments; peripheric stratum composed of polygonal cellules, smaller toward the circumference. *Fructification:* 1, *conceptacles* immersed in the branches, suspended among the axial filaments and enclosed in a network of filaments, containing moniliform strings of spores, radiating from a central placenta; 2, zonate *tetraspores* dispersed through the superficial stratum.—Rhabdonia (*Harv.*), from ραβδος, *a twig;* in allusion to the twiggy ramification of the species.

Frons filiformis, decomposite ramosa, tubulosa; tubo filis longitudinalibus ramosis anastomosantibus percurso; strato peripherico ex cellulis angulatis superficiem versus minoribus contexto. Fruct.: 1, *cystocarpia infra stratum periphericum suspensa, reticulo filorum velata, carpostomio demum aperta, fila sporifera moniliformia a placenta centrali emissa continentia;* 2, *tetrasporæ zonatim divisæ, per ramos minores sparsæ, immersæ.*

Rhabdonia *dendroides;* frond full-red, dendroid; stem elongate, robust, corneo-cartilaginous, rigid, decompound; lesser branches densely fasciculato-corymbose and subfastigiate at the extremity; ramuli taper-pointed, acute, not constricted at base; conceptacles immersed in the ramuli.

R. dendroides; *fronde rubra dendroidea, caule elongato robusto corneo-cartilagineo rigido decomposito, ramis minoribus apice densissime fasciculato-corymbosis subfastigatis, ramulis attenuatis acutis basi non constrictis, conceptaculis ramulis immersis.*

Rhabdonia dendroides, *Harv. in Herb. T.C.D.*

Hab. Western Port, *W. H. H.* Cape Shank, *Mrs. Barker.* Garden Island, Western Australia, *G. Clifton.*

Geogr. Distr. Bass's Straits, Western Australia.

Descr. *Root* much branched, rigid, the fibres clasping. *Stem* several inches long, 1½–2 lines in diameter, very rigid and opaque, simple below, variously divided upwards and breaking up finally into numerous cartilaginous, rather rigid branches. These are either long or short, subsimple or decompound, and are more or less furnished with short secondary branches which are very densely multiplied, and sometimes form broom-like tufts at the ends. The outline of these minor branches is often definite and subfastigiate. The ramuli are terete, tapering at the apex, but not at the base. *Cystocarps,* of at least twice the diameter of the part where they occur, are immersed in the ramuli; they contain within the thick walls of the frond a large nucleus,

composed of spore-threads issuing from a central placenta; the spores are ovoid, and of large size. The walls of the frond are much thicker and more densely cellular than in *R. coccinea*: the central filaments are more or less copious according to the age of the part examined. The *colour* is a dull red, becoming browner in drying. The *substance* is very firm and rigid, and only the younger portions of the frond adhere to paper in drying.

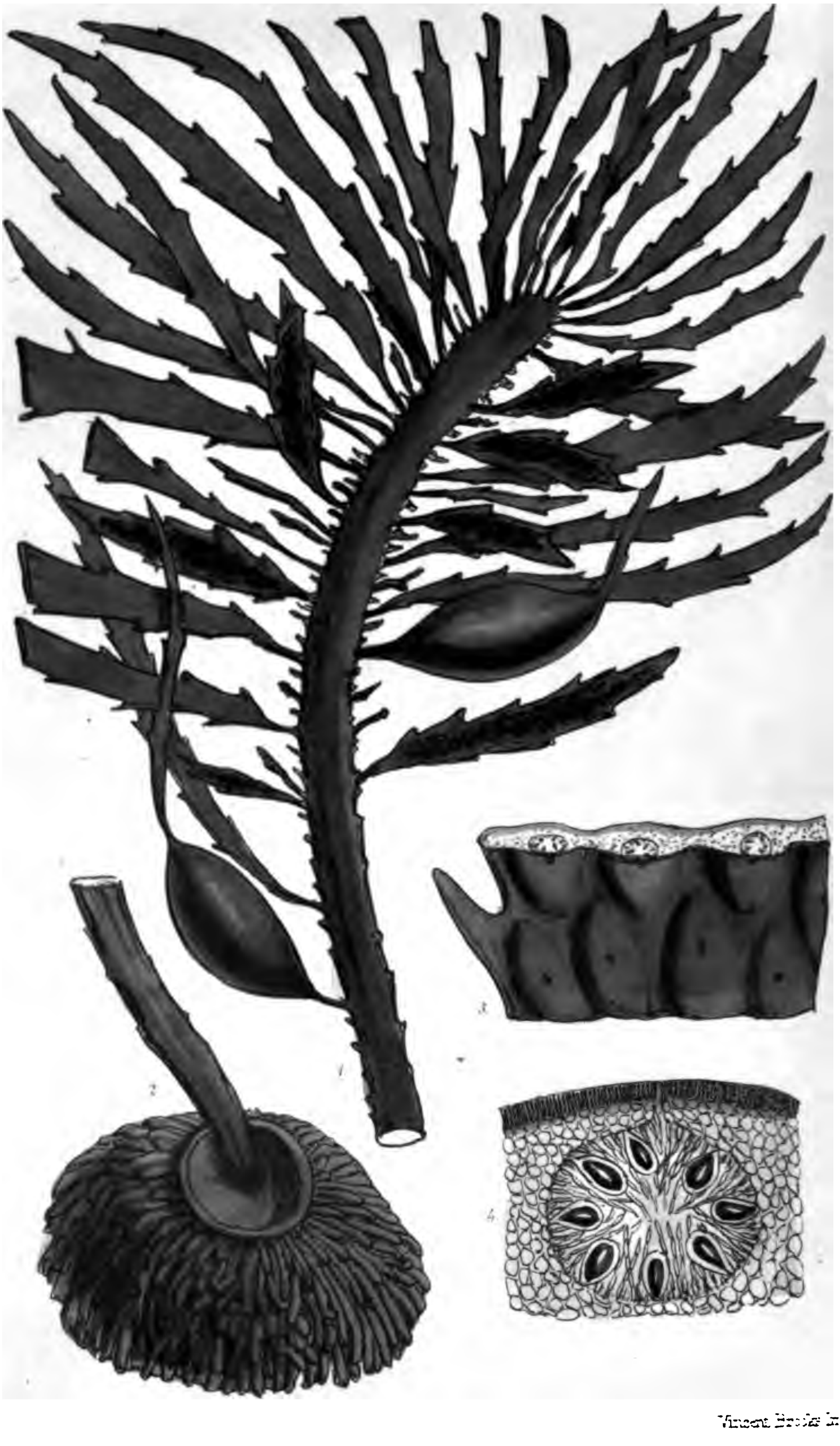
I am indebted to Mrs. Barker (through our mutual friend Dr. Ferd. Mueller) for a fine fruiting specimen of this rare plant, of which I only collected two or three specimens during my Australian tour. It is by much the most robust and rigid of the genus *Rhabdonia*, and also the most tree-like. The different specimens vary in extent of ramification, but all agree in the thick stem and densely crowded ramuli. The colour is by no means so bright as in *R. coccinea*, whose substance and habit also are quite different.

I have to thank Mrs. Barker for an interesting parcel of Algæ, well selected and carefully prepared,—and am happy to be able (as now) to figure the best plant it contained.

While this sheet is passing through the press I have received a specimen from Western Australia, from my indefatigable correspondent, G. Clifton.

Fig. 1. RHABDONIA DENDROIDES,—*the natural size*. 2. A ramulus, with immersed cystocarps. 3. Section through a cystocarp. 4. Spore-threads. 5. A cross section of the frond. 6. A longitudinal section:—variously *magnified*.

Plate CLII



Vincent Brooks Imp.

Plate CLIII.

PHYLLOSPORA COMOSA, *Ag.*

Gen. Char. *Root* fibrous. *Frond* pinnately decompound, with flat stem and branches, nerveless leaves, and proper vesicles, but without proper receptacles. *Vesicles* stipitate, marginal, simple, leaf-bearing. *Scaphidia* immersed in unmetamorphosed marginal leaves, diœcious. *Spores* obovoid.—Phyllospora (*Ag.*), from *φυλλον, a leaf,* and *σπορα, a seed;* because the fruit is placed in leafy organs, not in proper *receptacles.*

Radix fibrosa. Frons pinnatim ramosa, caule ramisque planis, foliis enerviis vesiculisque donata, receptaculis propriis nullis. Vesiculæ stipitatæ, marginales, simplices, foliiferæ. Scaphidia in lamina folii non transformata immersa, dioica. Sporæ obovoideæ.

Phyllospora *comosa;* stem flat, smooth, pinnately branched; leaves marginal, lanceolate-linear, attenuate, distantly toothed; vesicles ellipsoidal, leaf-bearing.

P. comosa; *caule plano lævi pinnatim ramoso; foliis marginalibus lanceolato-linearibus attenuatis subremote dentatis; vesiculis ellipsoideis foliiferis.*

Phyllospora comosa, *Ag. Rev. Macr. p.* 311. *t.* 28. *f.* 11. *J. Ag. Sp. Alg. v.* 1. *p.* 253. *Kütz. Sp. Alg. p.* 592. *Lond. Journ. Bot. v.* 4. *p.* 525. *Harv. in Fl. N. Zeal. v.* 2. *p.* 214. *Fl. Tasm. v.* 2. *p.* 283.

Macrocystis comosa, *Ag. Sp. p.* 48; *Syst. p.* 292. *Rich. Astr. N. Zeal. p.* 14, *et v.* 2. *p.* 142.

Fucus comosus, *Labill. Pl. Nov. Holl. t.* 258. *Turn. Hist. t.* 142.

Hab. In the Laminarian zone. South and south-east coasts of Australia. Tasmania.

Geogr. Distr. Australia. New Zealand.

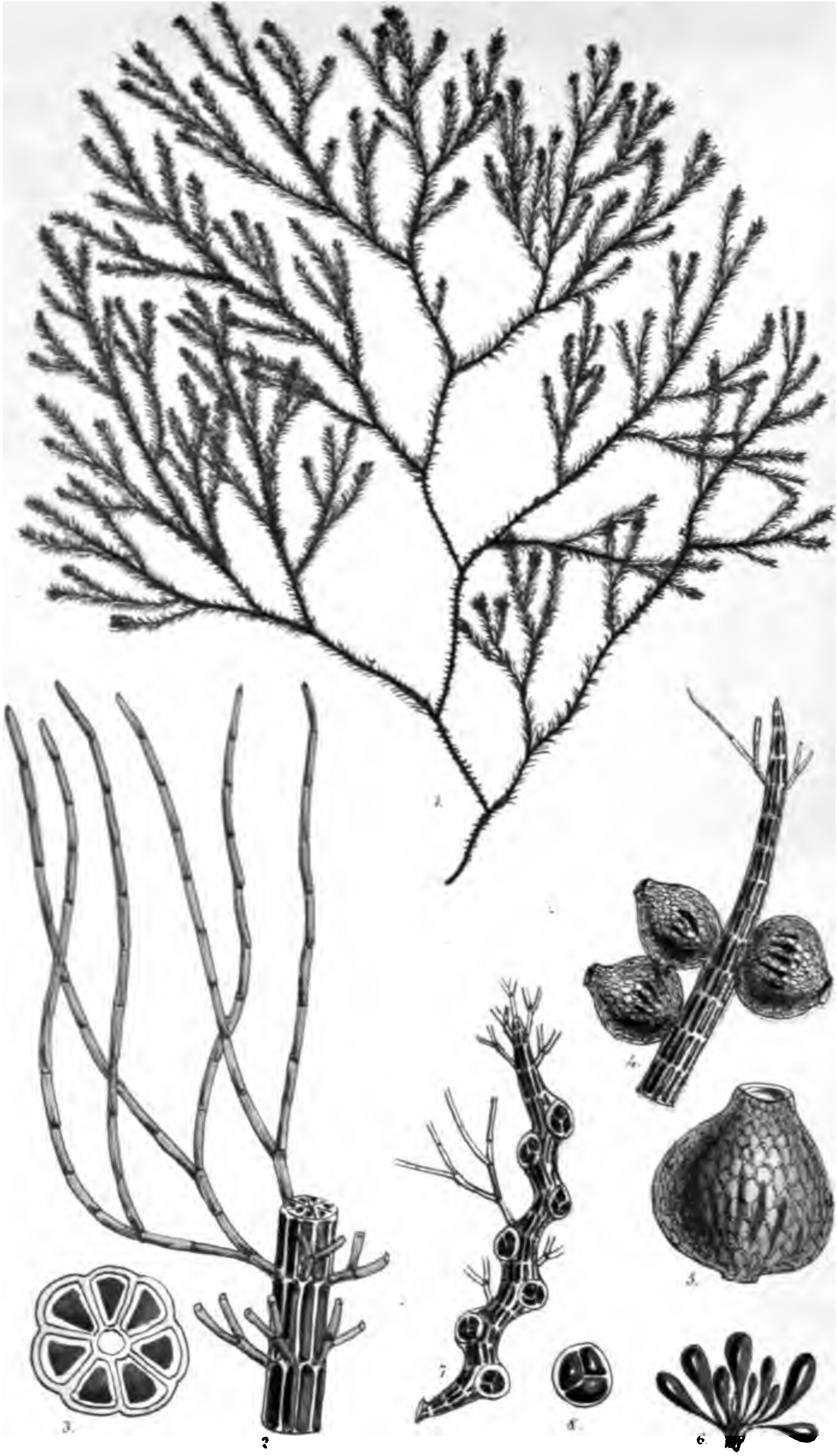
Descr. *Root* conico-hemispherical, composed of a large number of short, robust, simple, closely imbricating, obtuse fibres, radiating from a central, concave, margined disc, from the middle of which starts the solitary stem. *Frond* 12–20–30 feet long or more, pinnately decompound. *Stem* and *branches* strap-shaped, from quarter to nearly half an inch in breadth, preserving nearly the same width throughout, plano-compressed, two-edged, rather thicker in the middle, very densely beset throughout with irregularly scattered or crowded marginal leaves, intermixed with small ciliary processes that may develope into leaves. *Leaves* 4–6–8 inches long, 1–6 lines wide, tapering to each end, and sometimes much attenuated, either sharply and coarsely toothed or more or less entire, with a few distant, small, or obliterated teeth: very variable in this character. *Fruit-leaves* similar in form and position to the ordinary leaves, but shorter and generally broader, containing very many immersed spore-cavities (*scaphidia*). *Spores* and *antheridia* in different cavities. *Colour* a dull olive-brown, becoming darker in drying. *Substance* very tough and leathery, somewhat horny when dry.

This is one of the gigantic Fucoids of the Southern Ocean, and is allied to another giant of the North Pacific, namely, *Phyllospora Menziesii.* The nearest affinity with *Phyllospora* in the south is the *Landsburgia quercifolia* of New Zealand, a plant which I was formerly disposed to place in *Phyllospora*, but which differs somewhat in the evolution of the frond. Both genera differ from *Sargassum* in having their spore-cavities contained in unchanged or nearly unchanged leaves, instead of being lodged in proper receptacles.

The root of the present species is curiously formed, and in old specimens the disc, from the middle of which the stem springs, becomes deeply cup-shaped. The substance, when old, is very hard and woody; and when cast ashore, these roots resemble little birds'-nests more than anything marine. They are cast up in large numbers at the close of the year.

Fig. 1. Apex of a branch of PHYLLOSPORA COMOSA. 2. Root and base of stem; both of the *natural size*. 3. Section of a fruit-leaf, somewhat *magnified*. 4. Vertical section of a *spore-cavity* or *scaphidium*,—more highly *magnified*.

Plate CLI.



Vincent Brooks Imp.

PLATE CLIV.

POLYSIPHONIA CLADOSTEPHUS, *Mont.*

GEN. CHAR. *Frond* filiform, partially or generally articulate; the joints longitudinally striate, composed of numerous cylindrical cells surrounding a central cell (sometimes coated with one or several rows of smaller cells). *Fructification:* 1, ovate or urceolate *ceramidia,* containing a tuft of pear-shaped spores; 2, *tetraspores* immersed in swollen branches.—POLYSIPHONIA (*Grev.*), from πολυς, *many,* and σιφων, *a tube.*

Frons filiformis, plus minus articulata; articulis longitudinaliter pluristriatis, ex cellulis 4–20 *cylindraceis cellulam centralem cingentibus formatis (nunc cellulis minoribus pluriseriatis corticatis). Fruct.:* 1, *ceramidia;* 2, *tetrasporæ in ramulis ultimis uniseriatæ.*

POLYSIPHONIA *Cladostephus;* brownish-purple, flaccid; frond setaceous, elongate, alternately much branched; larger branches decompound, smaller erect, subsimple, all clothed with dichotomous, byssoid, whorled, monosiphonous ramelli; articulations of the branches seven-tubed, 2–4 times longer than broad, the upper shorter; ceramidia ovate, sessile; tetraspores uniseriate, in distorted branchlets.

P. Cladostephus; *fusco-purpurea, flaccida; fronde setacea elongata alterne ramosissima; ramis majoribus decompositis, minoribus erectis longe simplicibus, omnibus ramellis dichotomis byssoideis verticillatis monosiphoniis vestitis; articulis ramorum* 7*-siphoniis diametro* 2–4*-plo longioribus, superioribus sensim brevioribus, ceramidiis ovatis sessilibus, tetrasporis in ramulis distortis uniseriatis.*

POLYSIPHONIA CLADOSTEPHUS, *Mont. Voy. Pôl. Sud, v.* 1. *p.* 132. *t.* 13. *f.* 4 *a. Harv. Ner. Austr. p.* 45; *Alg. Austr. Exsic. n.* 199. *Harv. in Hook. Fl. N. Zeal. v.* 2. *p.* 232; *Fl. Tasm. v.* 2. *p.* 301.

POLYSIPHONIA byssoclados, *Harv. in Lond. Journ. v.* 3. *p.* 436.

CLADOSTEPHUS australis, *Ag. Syst. p.* 169.

GRIFFITHSIA australis, *Ag. Sp. Alg. v.* 2. *p.* 135.

BINDERA Cladostephus, *Dcne.*

HAB. Common on the western and southern coasts of Australia, and in Tasmania, *various collectors.*

GEOGR. DISTR. Lord Auckland's Island, New Zealand.

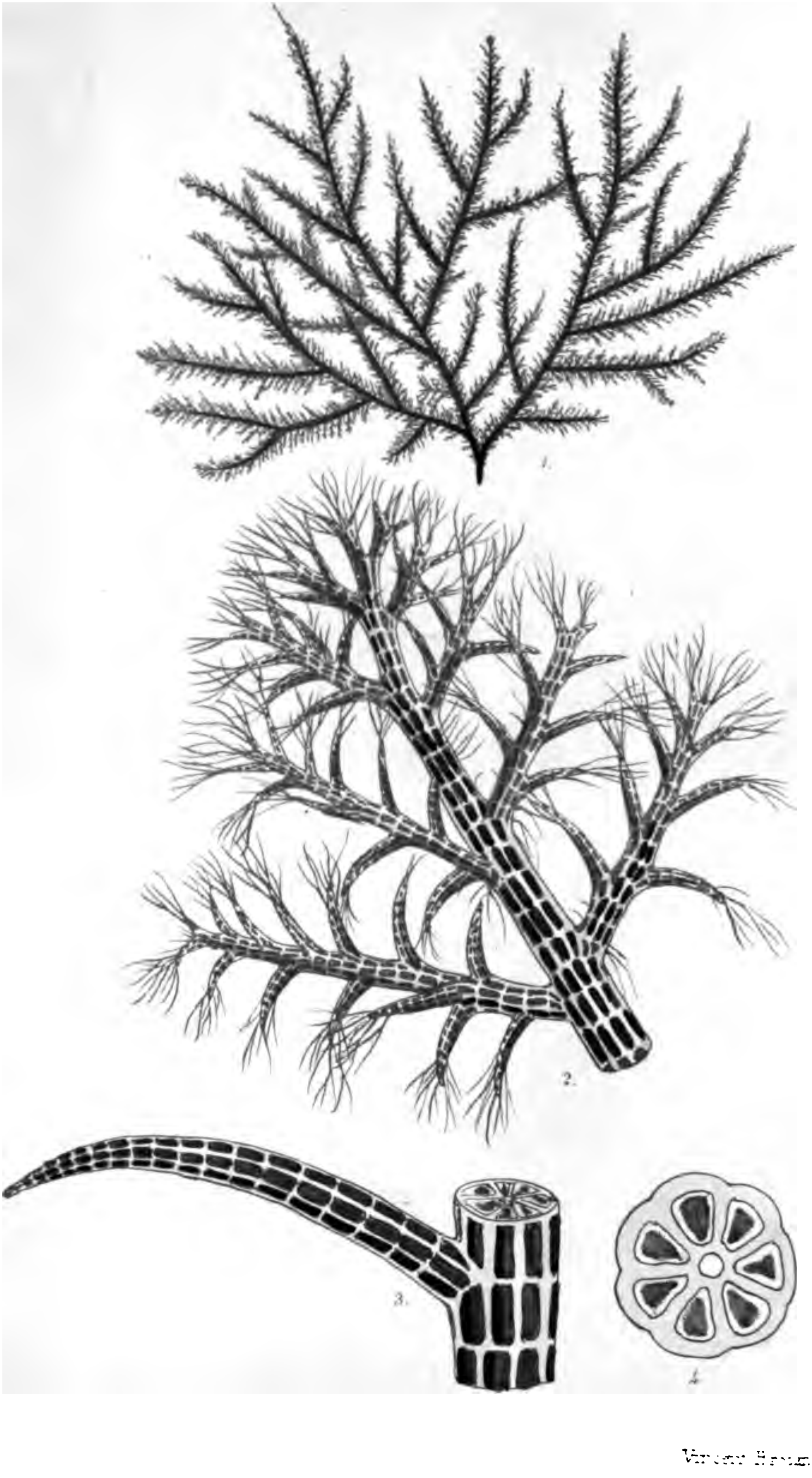
DESCR. *Root* discoid. *Fronds* densely tufted, 6–12 inches long or more, as thick as hog's-bristle, pellucidly articulate throughout, excessively branched, with an angularly-bent, more or less evident main stem. Principal *branches* somewhat ovate in outline, alternately decompound, several times divided, and more or less ramuliferous; all the angles sharp, and the divisions of the frond and branches erect or erecto-patent. The older parts of the frond are denuded and smooth, but all the vigorous and younger parts are beset, at every articulation, with a whorl of byssoid, monosiphonous ramelli. These ramelli are dichotomous, 1–2 lines long, very soft and slender, and long-jointed; in all respects resembling the ramelli of a *Dasya*. They are denser on the younger parts, and at the ends of the branchlets so crowded together that they make a dark, eye-like spot. The frond is seven-tubed, the articulations varying in length in different individuals and in different parts of the same individual; the articulations are all pellucid. The *ceramidia* are sessile on the sides of the smaller branches, ovate or broadly urceolate, and elegantly areolated with hexagonal cells. The *tetraspores* are set alternately on distorted branchlets. The *colour*, when recent, is a dark red-purple or vinous, becoming browner and darker in drying. The *substance* is soft, and in drying the frond adheres firmly to paper.

* * *

An abundant species on most parts of the southern coast, and easily known from every other Australian by the byssoid, one-tubed ramelli that whorl every joint, except on the denuded parts. These ramelli are similar in structure to the ramelli of a *Dasya;* but this species differs from *Dasya* and agrees with other *Polysiphoniæ* in having its tetraspores lodged, not in "*stichidia,*" but in the ordinary ramuli. A European species, *P. byssoidea,* agrees with our *P. Cladostephus* in this character, but differs in ramification and in other respects.

Fig. 1. Polysiphonia Cladostephus,—*the natural size.* 2. Joints of the stem and the ramellus. 3. Cross section of the stem. 4. Part of a ramulus, with ceramidia. 5. A ceramidium. 6. Spores from the same. 7. A ramulus, with tetraspores. 8. A tetraspore:—variously *magnified.*

Plate CLII.



Vincent Brooks Imp.

PLATE CLV.

POLYSIPHONIA SPINOSISSIMA, *Harv.*

GEN. CHAR. *Frond* filiform, partially or generally articulate; the joints longitudinally striate, composed of numerous cylindrical cells surrounding a central cell (sometimes coated with one or several rows of smaller cells). *Fructification:* 1, ovate or urceolate *ceramidia,* containing a tuft of pear-shaped spores; 2, *tetraspores,* immersed in swollen branches.—POLYSIPHONIA (*Grev.*), from πολυς, *many,* and σιφων, *a tube.*

Frons filiformis, plus minus articulata; articulis longitudinaliter pluristriatis, ex cellulis 4–20 *cylindraceis cellulam centralem cingentibus formatis (nunc cellulis minoribus pluriseriatis corticatis). Fruct.:* 1, *ceramidia;* 2, *tetrasporæ in ramulis ultimis uniseriatæ.*

POLYSIPHONIA *spinosissima;* brownish, densely tufted; frond setaceous, shrubby, articulate throughout, furrowed, decompoundly much branched; branches directed every way, close together, patent, virgate, several times pinnately decompound; ramuli spine-like, squarrose, spirally inserted, very short and close together; articulations 7-tubed, those of the branches once and half as long as broad, those of the ramuli very short.

P. spinosissima; *fuscescens, dense cæspitosa, fronde setacea fruticosa articulata sulcata decomposite ramosissima; ramis quaquaversis creberrimis patentibus pluries pinnatim compositis; ramulis spinæformibus squarrosis spiraliter insertis brevibus crebris; articulis septemsiphoniis, ramorum diametro sesquilongioribus, ramulorum brevissimis.*

POLYSIPHONIA spinosissima, *Harv. Alg. Austr. Exsic. n.* 173. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 301.

HAB. In a salt-water creek near "Belfast," Port Fairy, *W. H. H.* Tasmania, *C. Stuart.*

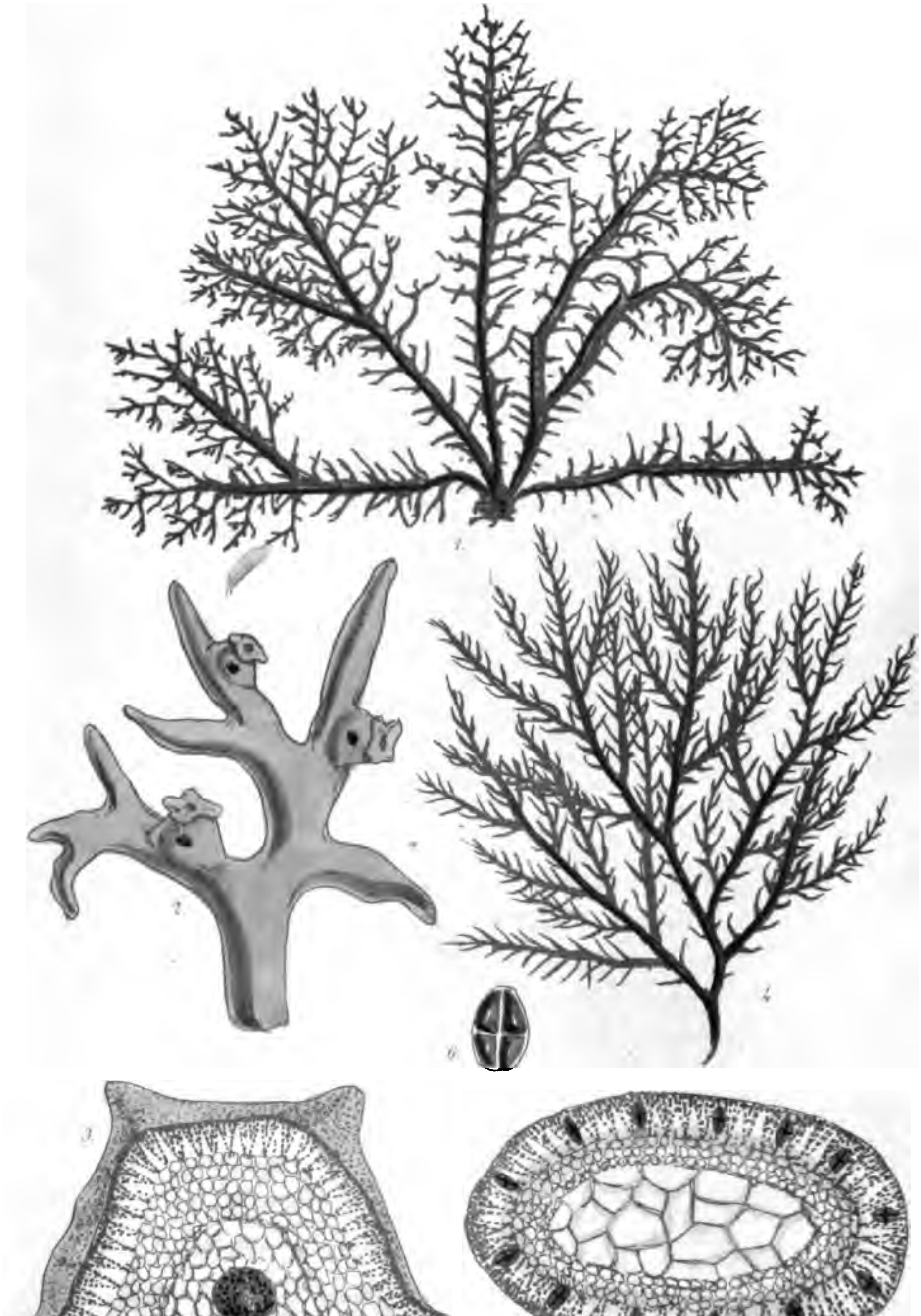
GEOGR. DISTR. South coasts of Australia. Tasmania.

DESCR. Fronds densely tufted, 2–3 inches high, pellucidly articulate throughout, alternately branched, shrubby. *Branches* virgate, subsimple, very densely set throughout, as well as the stem, with short, patent ramuli directed to every side. *Ramuli* spine-like, 2–3 lines long, closely crowded, when young simple and slenderly subulate, afterwards set with smaller secondary subulate ramuli: all tipped with hair-like fibres. Articulations 7-tubed, rather shorter than their breadth, with wide hyaline spaces between the tubes, and broad hyaline dissepiments. *Fruit* unknown. *Colour* brownish, with slightly purple tinge. *Substance* cartilaginous, rather firm when growing, but becoming flaccid. When dry the frond adheres closely to paper.

This belongs to the same section as *P. cancellata* and its allies, but differs from all of that group by the very densely set and spine-like compound ramuli, sprouting from all sides of the stem and branches. In the habitat near Belfast it occurs abundantly, but none of the specimens collected by me were in fruit. Perhaps the fruit, when discovered, may afford further characters.

Fig. 1. POLYSIPHONIA SPINOSISSIMA,—*the natural size.* 2. Apex of a branch, with ramuli. 3. An ultimate ramulus. 4. Cross section of a branch:—the latter figures *magnified.*

Plate [illegible]



Vincent Brooks, Imp.

PLATE CLVI.

HOREA FRUTICULOSA, *Harv.*

GEN. CHAR. *Frond* fleshy-membranous, plano-compressed, composed of three strata of cells; the *medullary* stratum of large, empty, thin-walled cells (often ruptured); the *intermediate,* of several rows of smaller, coloured, angular cells; the *cortical,* of vertical, dichotomous, moniliform filaments, set in gelatine. *Fructification:* 1, *favellæ* within a proper external pericarp crowned with spines, and opening by a pore, attached to a basal placenta, invested with cobwebby interwoven filaments, and containing angular spores; 2, cruciate *tetraspores,* dispersed among the filaments of the cortical stratum.—HOREA (*Harv.*), in honour of the Rev. W. S. Hore, an accomplished naturalist.

Frons carnoso-membranacea, plano-compressa, ex stratis tribus cellularum composita; stratum medullare cellulis maximis inanibus demum sæpe ruptis, intermedium cellulis pluriseriatis minoribus coloratis, corticale filis moniliformibus verticalibus dichotomis muco cohibitis formatum. Fruct.: 1, *Favellæ intra pericarpium externum apice spinis coronatum poro pertusum, ad placentam basalem affixæ, filis arachnoideis laxe circumdatæ, sporas conglobatas angulares foventes;* 2, *tetrasporæ sparsæ, cruciatim divisæ.*

HOREA *fruticulosa;* frond shrubby, tereti-compressed, irregularly much-branched, pale-red, succulent; branches virgate, subsimple, beset with subulate, simple or subsimple, quadrifarious ramuli; conceptacles 4-horned, on squarrose branchlets.

H. fruticulosa; *fronde fruticulosa tereti-compressa vage ramosissima rubra succosa; ramis virgatis simpliciusculis ramulis subulatis simplicibus v. subramosis crebre obsessis; cystocarpiis 4-cornutis ramulis squarrosis insidentibus.*

HOREA fruticulosa, *Harv. Alg. Exsic. Austr. n.* 440.

HAB. Port Phillip Heads, rare, *W. H. H.*

GEOGR. DISTR. (As above.)

DESCR. *Root* branching. *Fronds* tufted, 3–6 inches long, 1–1½ lines in diameter, shrubby, between cylindrical and compressed, very irregularly much branched. The conceptacle-bearing individuals are more robust and rigid, and more irregularly branched and squarrose than those that bear tetraspores. These last have generally a leading stem, closely set throughout with lateral branches directed to all sides, patent, subsimple, and virgate or flexuous, rather densely set with slender, subulate and attenuate ramuli. The *ramuli* are 3–5 lines long, and very acute. Those of the conceptacle-bearing plants are often much divided, especially such as bear the conceptacles. *Conceptacles* sessile, truncato-conical, crowned with about four short horns or tubercles. *Tetraspores* cruciate, abundant in the periphery of the subulate ramuli. The *colour* is a pale, sometimes a very pale, rather dull red, somewhat brownish in the stronger specimens. *Substance* at first rather crisp, soon becoming flaccid in the air, soft and juicy. In drying the frond adheres closely to paper.

At Plate LXVII. is figured the original species on which the genus *Horea* was founded: and two others are figured in the 'Flora of Tasmania.' Our present Plate represents still another, and the only other known species. It is the least expanded, and the most shrub-like of the genus, but agrees with all the rest in fruit and structure.

There is greater diversity between the individuals that bear the different fruits in this than in the other species: those that bear conceptacles having a stunted growth, and much more irregular and more divided ramification.

Fig. 1. HOREA FRUTICULOSA; a conceptacle-bearing individual,—*the natural size*. 2. Ramulus, with conceptacles. 3. Vertical section of a conceptacle,—*variously magnified*. 4. A tetraspore-bearing individual,—*the natural size* 5. Cross section of a ramulus, with the tetraspores *in situ*. 6. A tetraspore —*variously magnified*.

Plate CL

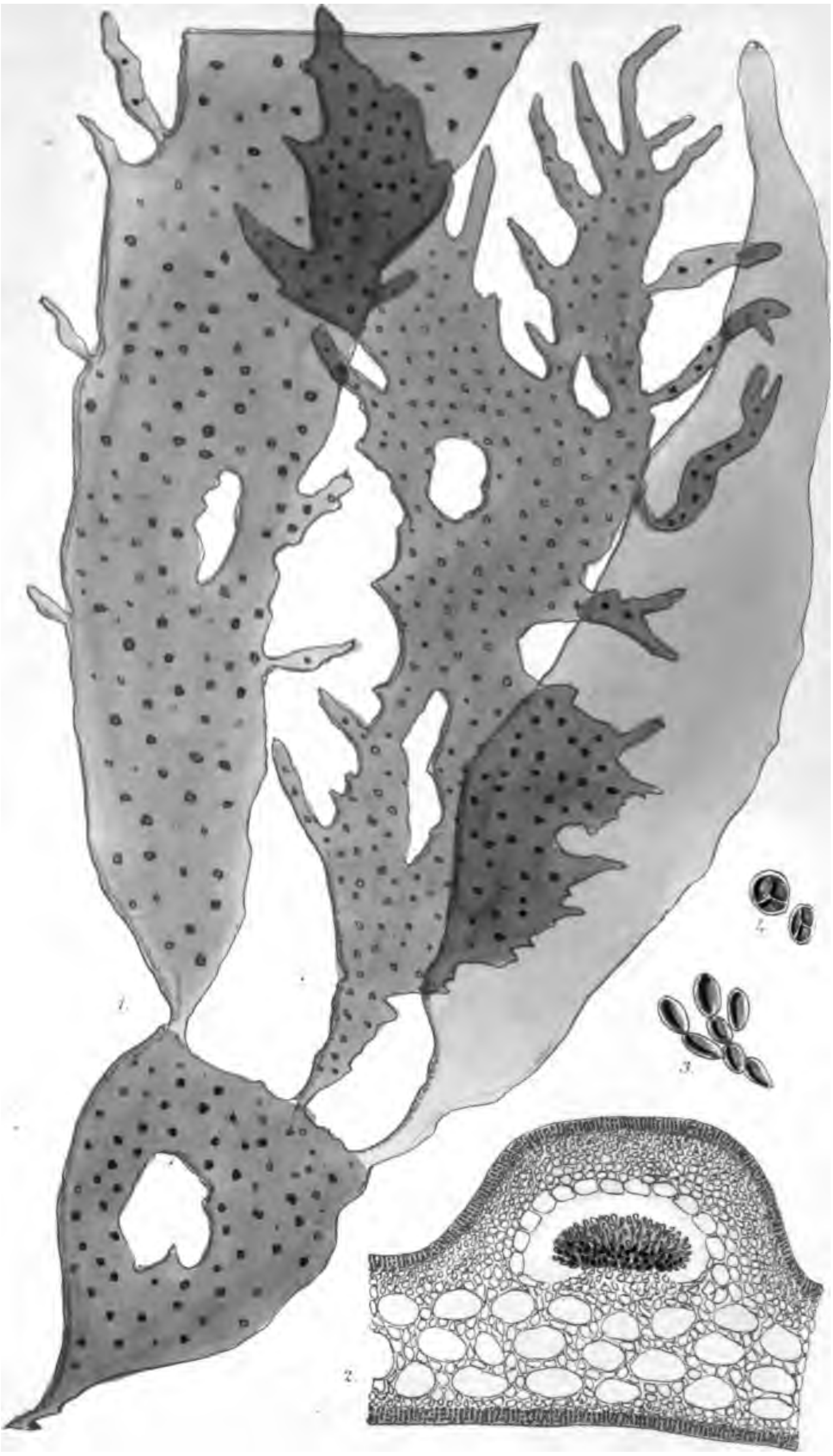


PLATE CLVII.

RHODYMENIA POLYMORPHA, *Harv.*

GEN. CHAR. *Frond* flat, membranous, dichotomous or palmate, composed of two strata of cells; the *medullary* stratum of oblong, polygonal, larger cells; the *cortical* of minute, vertically seriated cellules. *Fructification:* 1, sessile, hemispherical, thick-walled *conceptacles,* at length opening by a terminal pore, containing densely-packed, sporiferous filaments issuing from a basal placenta, and surrounded by a gelatinous pellicle; 2, cruciate or tripartite *tetraspores,* either scattered over the frond, collected in *sori,* or immersed in terminal, shield-like *nemathecia.*—RHODYMENIA (*Grev.*), from ῥοδεος, *red,* and ὑμην, *a membrane.*

Frons plana, membranacea, dichotoma v. palmata, stratis duobus composita; strato medullari ex cellulis majusculis oblongis polyhedris, corticali cellulis minimis coloratis pluriserialibus conflato. Fruct.: 1, *cystocarpia sessilia, hemisphærica, intra pericarpium crassum demum carpostomio apertum fila sporifera densissime aggregata, e placenta basali emissa, pelliculâ gelatinoso-cellulosâ velata foventia;* 2, *tetrasporæ cruciatim v. triangule divisæ, nunc sparsæ, nunc in soros subdefinitos collectæ v. in nematheciis terminalibus immersæ.*

RHODYMENIA *polymorpha;* stipes short, very soon expanding into the base of the frond; frond dull red or pale-purplish, very broad, oblong or ovate, polymorphous, sometimes simple, with the margin leaf-bearing, sometimes cleft into numerous lanceolate segments; segments either simple or variously cleft, or producing marginal leaves; cystocarps very numerous, scattered over the whole frond.

R. polymorpha; *stipite brevi mox in basi frondis explanato; fronde dilute rubra latissima oblongo-ovata polymorpha nunc subsimplici margine foliifera, nunc in lacinias plures lanceolatas fissa; laciniis nunc simplicibus nunc marginé foliiferis v. varie inciso-partitis; cystocarpiis numerosissimis per totam frondem dispersis.*

RHODYMENIA polymorpha, *Harv. Alg. Austr. Exsic. n.* 383; *Harv. in Hook. fil. Fl. Tasm. v.* 2. *p.* 319.

HAB. Thrown up from deep water. Port Fairy, Port Phillip Heads, and Philip Island, Western Port, *W. H. H.* Georgetown, Tasmania, *W. H. H.*

GEOGR. DISTR. Southern coasts of New Holland. Bass's Straits, both sides.

DESCR. *Root* a small disc. *Stem* compressed, cartilaginous, ½–¾ inches long, cuneate upwards and gradually expanding into the base of the frond. *Frond*

1–2 feet long or more, 2–3 inches wide, extremely variable in shape. The primitive form appears to be oblong, or obovate-oblong, tapering at base, either blunt at the extremity or tapering to a subacute point. Sometimes it is quite simple, with the margin variably indented or sinuate; more frequently the marginal teeth are developed into leaf-like lateral lobes, 1–6 inches long, and ½–1½ inch wide. Specimens that bear tetraspores are very generally deeply divided, and sometimes cleft nearly to the base into numerous broadly-lanceolate segments, which are then either quite entire and flat, or else margined throughout with lateral leaflets. The surface is generally quite smooth and glossy, but is sometimes bullated, and occasionally roughened by small processes. The *cystocarps* are extremely numerous, and profusely scattered over the whole frond; they are hemispherical, thick-walled, and contain a dense nucleus within a large cavity. The *tetraspores* are triangularly parted, and form cloudy patches, dispersed over the frond. The *colour* varies from a dull livid-purplish to a rather bright but pale blood-red: it soon fades on exposure. The *substance* is thickish-membranous, or like parchment, shrinking in drying, and imperfectly adhering to paper. It bears steeping in fresh-water, without injury, for a considerable time.

With the structure and fructification of *Rhodymenia* this species has much of the habit and extreme irregularity of outline of an *Iridæa* or of the broad-fronded *Gigartinæ*, such as *G. radula*. Our figure represents an average form, but many folio plates might be filled to little purpose with varying individuals, without exhausting the "sports" of this most sporting plant. Still, there is that general agreement in substance and texture, and that scarcely definable resemblance between all, that make it easy, on the shore, to combine the many shapes under one ideal type. In the herbarium it is not so easy, without comparison of a very extensive suite. Hence single specimens, or a solitary figure, of this plant, can scarcely be said to illustrate it.

Its nearest affinity is with *R. pertusa*, of the N.W. Pacific, and *R. sanguinea*, of New Zealand.

Fig. 1. RHODYMENIA POLYMORPHA; *the natural size*. 2. Vertical section of a conceptacle, and of the frond. 3. Spores from the nucleus. 4. Tetraspores: —*variously magnified*.

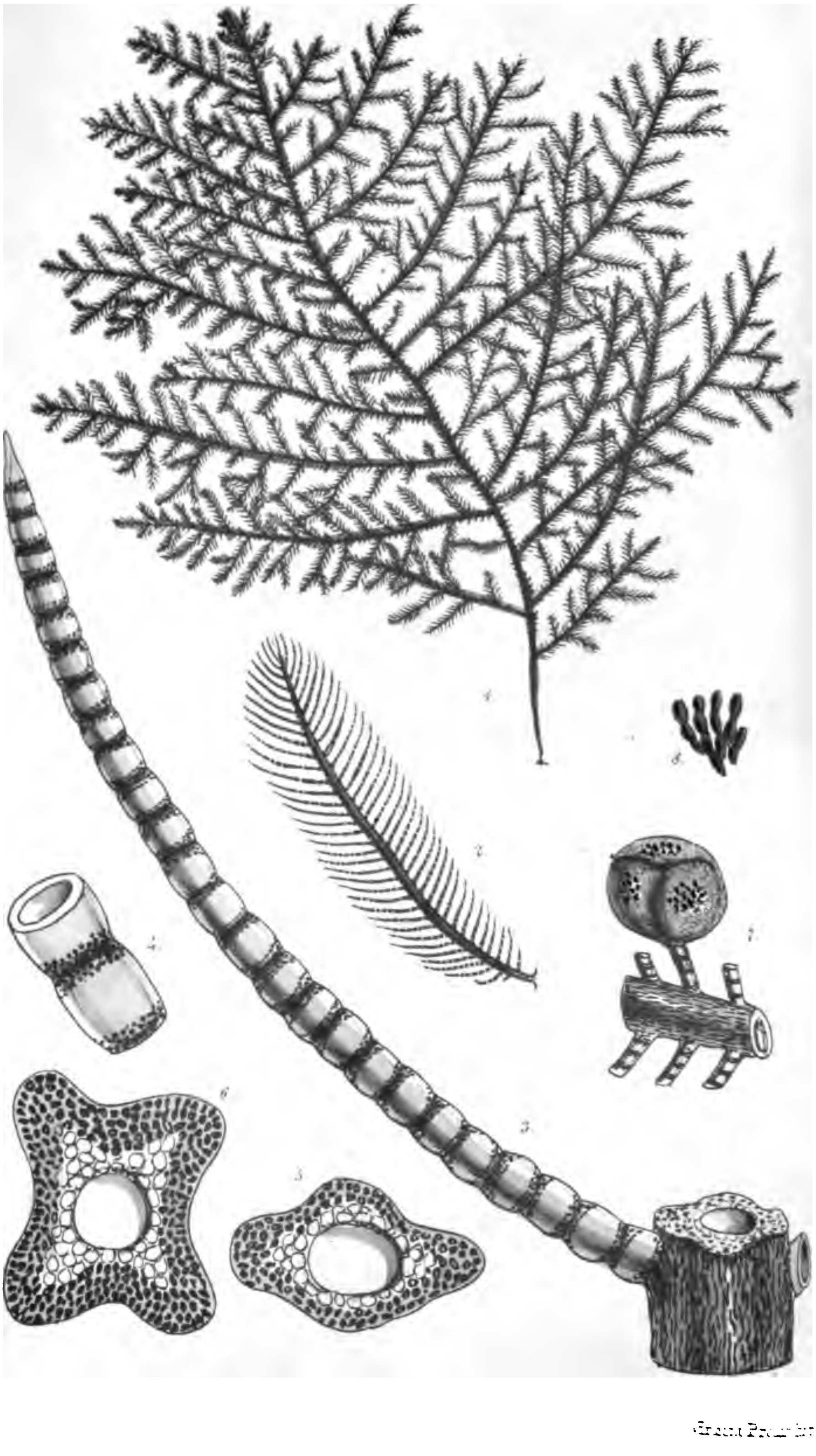

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PLATE CLVIII.

SPYRIDIA OPPOSITA, *Harv.*

GEN. CHAR. *Frond* filiform, pinnately decompound, articulated, but gradually becoming coated with a layer of small, coloured cellules; branches and ramuli furnished with minute, bristle-shaped, articulated ramelli. *Cystocarps* terminating short branches, involucrated or naked, containing within a closed, membranous pericarp, numerous *nucleoli* of oblong spores. *Tetraspores* formed along the ramelli, external, sessile, triangularly parted.—SPYRIDIA (*Harv.*), from σπυρις, *a basket.*

Frons filiformis, pinnatim decomposita, articulata, sensim cellulis minutis coloratis corticata; ramis ramulisque ramellis articulatis setiformibus minutis plus minus instructis. Cystocarpia ramos breves terminantia, ramellis involucrata, v. nuda, intra pericarpium clausum membranaceum nucleolos plures sporarum oblongarum foventia. Tetrasporæ ad genicula ramellorum evolutæ, externæ, sessiles, triangule divisæ.

SPYRIDIA *opposita;* frond bluntly four-angled, decompoundly much-branched, distichous; branches and ramuli closely pinnulated with opposite, setaceous, subdistichous ramelli; ramelli incurved, subulate, acute, not constricted at base, their articulations as long as broad; cystocarps without involucre.

S. opposita; *fronde obtuse quadrangulari decomposita ramosissima disticha; ramis ramulisque ramellis oppositis subdistichis setaceis crebre pinnulatis; ramellis incurvis subulatis acutis nec basi angustatis; articulis ramellorum diametro æqualibus; cystocarpiis basi nudis (nec involucratis).*

SPYRIDIA OPPOSITA, *Harv. in Hook. fil. Fl. N. Zeal. v.* 2. *p.* 256. *Harv. Alg. Austr. Exsic. n.* 464.

HAB. Near Cape Northumberland, *Mrs. Eddington.* Philip Island, Western Port, *W. H. H.* Fremantle, *G. Clifton.* Southport, Tasmania, *C. Stuart.*

GEOGR. DISTR. Western and southern coasts of Australia. Tasmania. New Zealand.

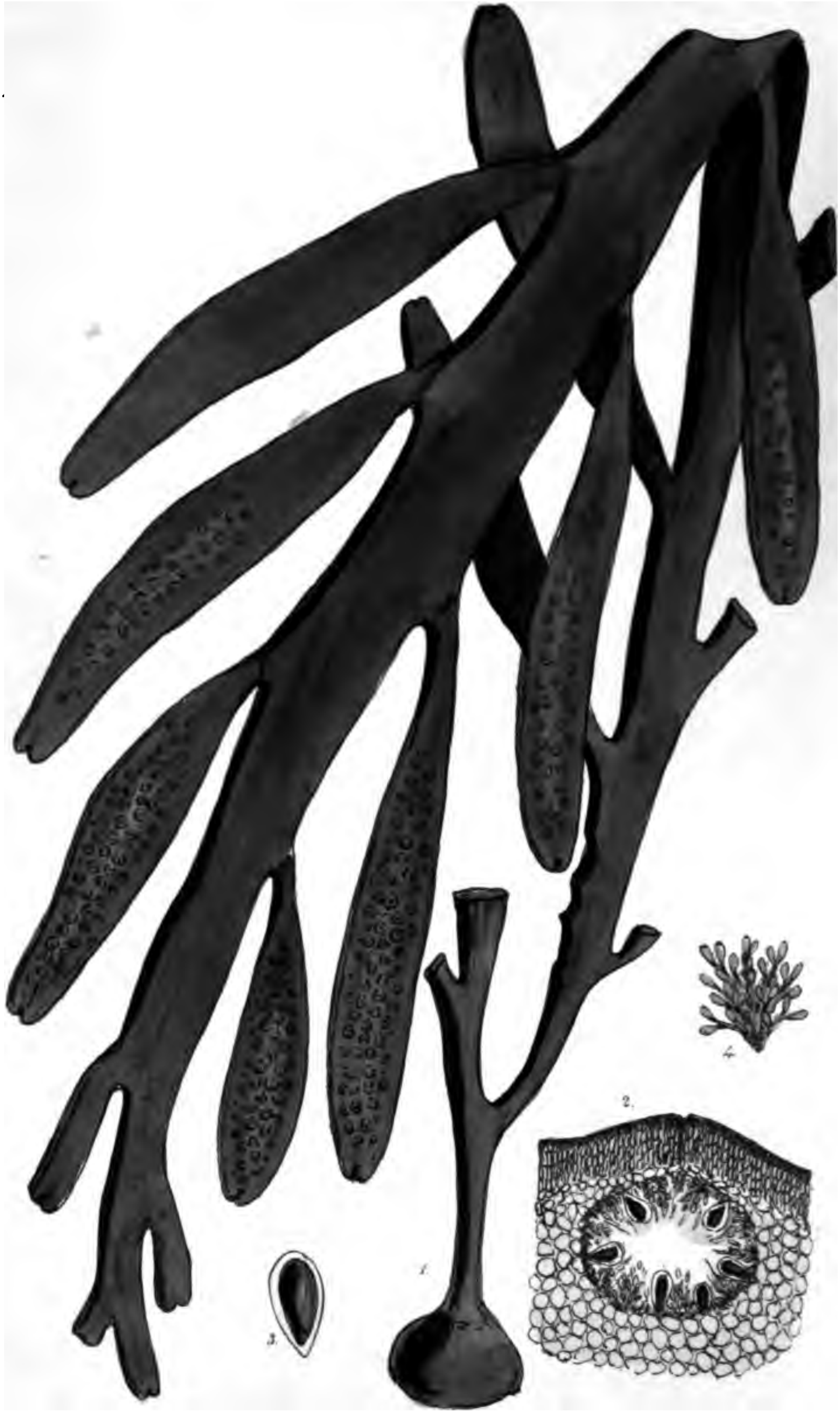
DESCR. *Root* a small disc. *Stem* once or twice forked near the base, or undivided, 4–6 inches long, compresso-quadrangular, with rounded, prominent angles, closely set throughout with alternate, lateral, subhorizontally patent, simple branches. These branches are once or twice distichously pinnate, the pinnæ irregularly set, and of very unequal length. *Pinnules* few and short. The younger part of the stem, and the branches and their divisions, are all closely pectinato-pinnate, with opposite, hair-like, simple ramelli,

¼ line long, and either distichous or irregularly decussating. The *frond* is corticated throughout with several rows of minute, coloured cellules, through which the internal articulations are scarcely visible, except in the smaller ramuli; the *ramelli* are plainly articulate, and cross-banded at the dissepiments with rows of coloured, dot-like cellules. *Cystocarps* (found on half-denuded fronds, in the winter season) borne on the tips of shortened ramelli, subglobose, imperfectly 3-lobed, without involucre, containing three clusters of spores. *Tetraspores* unknown. *Colour* of the frond dark-red; of the ramuli a full blood-red or rosy. *Substance* rather rigid. In drying it very imperfectly adheres to paper.

A distinctly-marked and rather extensively distributed species of *Spyridia;* a small genus, whose typical species, *S. filamentosa,* is almost cosmopolitan, being absent only from the colder zones. The specimens of our *S. opposita* from New Zealand, quite accord with those from the south coast of Australia, but are rather less luxuriant than Mr. Clifton's from western Australia. None that we have seen produce *tetraspores;* nor have *cystocarps* been found except by Mr. C. Stuart, from one of whose specimens our figure has been taken. The *exactly* opposite and nearly *distichous* ramelli easily distinguish this from any variety of *S. filamentosa.* The structure of frond and ramelli is nearly the same in both species. The colour of *S. opposita* is much fuller, brighter, and more enduring.

Fig. 1. SPYRIDIA OPPOSITA,—*the natural size.* 2. A ramulus, pinnulated with opposite ramelli. 3. A ramellus, inserted on a fragment of the ramulus. 4. Section of a ramellus. 5, 6. Section of a younger and older branch of the frond. 7. A three-lobed cystocarp *in situ.* 8. String of spores from the same:—*variously magnified.*

Plate CLII



Vincent Brooks Imp

Plate CLIX.

CARPOGLOSSUM CONFLUENS, *Kütz.*

Gen. Char. *Root* discoid. *Frond* with subdistinct stem and leaves, pinnate; leaves vertically flattened, imperfectly costate. *Vesicles* and *receptacles* none. *Spore-cavities* scattered over both surfaces of the leaves, hemispherically prominent, monœcious. *Paranemata* simple.—Carpoglossum (*Kütz.*), from καρπος, *fruit*, and γλωσσα, *a tongue;* because the fruit-bearing leaves are tongue-shaped.

Radix scutata. Frons caule a foliis subdistincto heterogenea, pinnatim decomposita; phyllodiis verticaliter applanatis, immerse costatis. Receptacula propria et vesiculæ nullæ. Scaphidia in utraque pagina foliorum sparsa, hemisphærice prominentia, monoica. Sporæ obovoideæ, subsessiles. Paranemata simpliciuscula.

Carpoglossum *confluens;* frond laxly pinnated or bi-tripinnated; stem flat, obsoletely midribbed, broader than the erect, simple (or pinnately compound), very entire, obtusely emarginate, linear-cuneate phyllodia; spore-cavities in many rows.

C. confluens; *fronde laxiuscule pinnata v. bi-tripinnatim decomposita; caule plano obsolete contorto, phyllodiis erectis simplicibus (v. pinnatim compositis) integerrimis obtuse emarginatis lineari-cuneatis latiore; scaphidiis pluriseriatis.*

Carpoglossum confluens, *Kütz. Phyc. p.* 352. *J. Ag. Sp. Alg. v.* 1. *p.* 195. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 286; *Alg. Austr. Exsic. n.* 40.

Fucus confluens, *R. Br. in Turn. Hist. t.* 141. *Ag. Sp. Alg. p.* 95; *Syst. p.* 278.

Hab. Laminarian zone. Port Dalrymple, Tasmania, *R. Brown.* Port Arthur, *Lyall, W. H. H.* Port Phillip Heads and Western Port, *Dr. Mueller, W. H. H.*

Geogr. Distr. Southern coasts of New Holland; north and south coasts of Tasmania.

Descr. *Root* a conoidal callus, half to three-quarters of an inch diameter. *Frond* fourteen inches to 2–3 feet long, when young or dwarfed simply pinnate, when full-grown twice or thrice pinnately compounded. The principal rachis and the rachides of the larger branches of old fronds are 5–8 lines wide, tapering to the base, broader upwards, and again slightly narrowing to the blunt extremity, flat, imperfectly midribbed, sharp-edged, and perfectly entire. All the divisions stand very erect and have rounded axils. The ultimate segments are linear-cuneate, half an inch wide or less, narrowed at base, minutely notched at the apex, and linear-oblong or somewhat cuneate; if

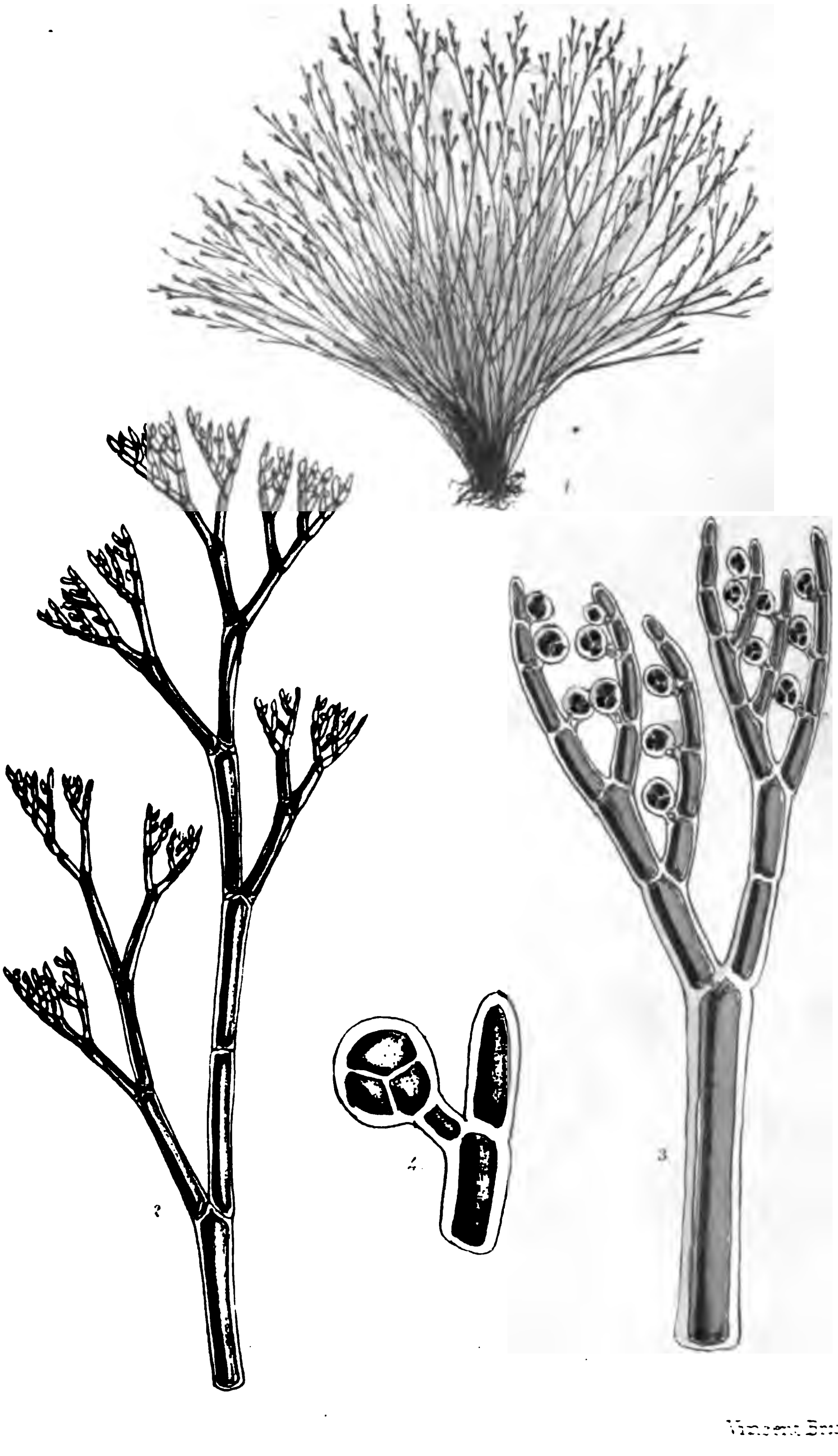
injured at the point, a new segment is often thrown out from the injured part. *Spore-cavities* (*scaphidia*) are produced in unaltered lateral segments, and finally cover the whole surface of the segment in 4–6 rows; they contain both antheridia and spores. The *colour* is a dark olive-brown, turning black in drying. *Substance* leathery, discharging much mucus in fresh-water.

At Plates XLIII. and CXXVIII. are figured two other species of *Carpoglossum*, both easily distinguishable from each other, and neither likely to be confounded with the subject of our present Plate. This latter was first found by Mr. R. Brown, who named it "*confluens*," because its several parts seem almost to *melt* into one another; the midrib passing insensibly into lamina; the lamina into stem; and the leaf-like branches into half-formed receptacles.

It commences to grow about low-water mark, and gradually increases in size as the water deepens. Specimens raised from the deeper parts of the Laminarian zone are much more branched, with longer and far narrower segments than the one here chosen for illustration.

Fig. 1. CARPOGLOSSUM CONFLUENS,—*the natural size*. 2. Section of a *scaphidium*. 3. A spore. 4. A tuft of *antheridia*:—variously *magnified*.

Plate 6



Vincent Brooks

PLATE CLX.

CALLITHAMNION GRIFFITHSIOIDES, *Sond.*

GEN. CHAR. *Frond* filiform, branched, articulated, monosiphonous, the stem and branches (in many species) at length thickened internally, or coated externally with decurrent filaments; ramuli always pellucidly articulate and monosiphonous. *Fructification:* 1, *favellæ* generally in pairs, axillary or sessile on the branches, naked, containing numerous angular spores; 2, *tetraspores* naked, sessile or pedicellate, distributed on the ramuli, generally triangularly parted.—CALLITHAMNION (*Lyngb.*), from καλλις, *beautiful*, and θαμνιον, *a little shrub.*

Frons filiformis, ramosa, articulata, monosiphonia, caule ramisque majoribus (in pluribus) demum fibris decurrentibus interne vel externe evolutis corticatis v. firmatis; ramulis semper pellucide articulatis. Fruct.: 1, *favellæ binatæ, axillares v. ad ramos sessiles, nudæ, sporas numerosas angulatas foventes;* 2, *tetrasporæ nudæ, ad ramulos sessiles v. pedicellatæ, triangulæ v. cruciatim divisæ.*

CALLITHAMNION *Griffithsioides;* densely tufted, bright rosy-red; fronds interwoven at base, setaceous, pellucidly articulate, dichotomous, fastigiate; branches several times forked with acute axils, bearing towards the apex minute, multifid ramuli; ramuli closely branched, nearly corymbose, fruit-bearing; tetraspores pedicellate, near the ends of the ramuli; articulations cylindrical, 6–8 times as long as broad.

C. Griffithsioides; *cæspitosum, coccineum; frondibus basi intertextis setaceis pellucide articulatis dichotomis fastigiatis; ramis pluries furcatis (axillis acutis), apicem versus ramulos minutos multifidos ferentibus; ramulis crebre ramulosis fere corymbosis fructiferis; tetrasporis prope apices ramulorum fasciculatis pedicellatis, articulis cylindraceis diametro* 6–8*-plo longioribus.*

CALLITHAMNION Griffithsioides, *Sond. in Linn. v.* 26. *p.* 512. *Harv. in Hook. fil. Fl. Tasm. v.* 2. *p.* 336.

CALLITHAMNION Griffithsiæ, *Harv. Alg. Austr. Exsic. n.* 535.

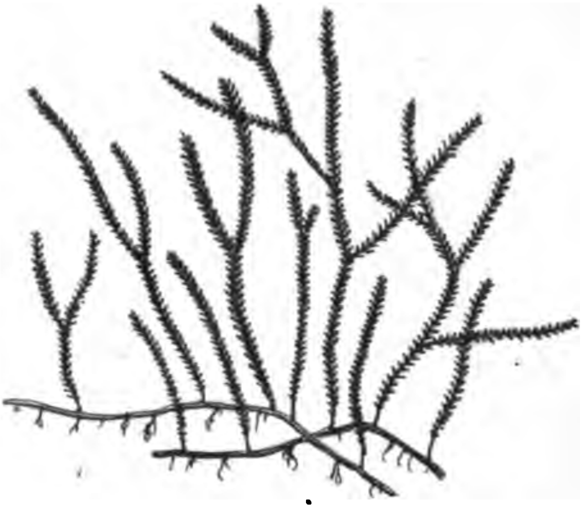
HAB. Wilson's Promontory, 1853, *Dr. Ferd. Mueller.* Port Fairy, 1854, *W. H. H.* Georgetown, Tasmania, 1848, *R. Gunn.*

GEOGR. DISTR. South coast of New Holland. Tasmania.

DESCR. *Root* an entangled mass of creeping fibres. *Filaments* as thick as hog's bristle, densely tufted, 3–5 inches long, pellucidly articulated from the base, many times regularly forked, spreading equally, and nearly fastigiate. All the divisions of the frond are very erect, and the angles acute; each fork of the larger branches is 4–8 lines apart. In barren specimens the terminal ramifications are filiform and quite simple; in fertile ones they bear closely much branched corymbs of minute inflexed fructiferous ramuli. The *tetraspores* are globose, tripartite, shortly pedicellate, and issue one from each articulation of the ramulus, along its inner face. The apices are obtuse. The *articulations* are cylindrical, with wide hyaline borders, and many times longer than their diameter; those of the smaller branches and ramuli become gradually shorter upwards. The *colour* is a brilliant rosy-crimson. The *substance* is crisp when fresh, but soon softens on exposure, and rapidly decomposes in fresh-water. In drying the plant closely adheres to paper, which it stains carmine.

A brilliantly coloured species, with a good deal of the aspect, ramification, colour, and substance, but not the *fruit*, of *Griffithsia setacea:* for which, except when in fruit, it might readily be mistaken. Both plants, when thrown into fresh-water while still living, are apt to burst their cells with a crackling noise, discharging the endochrome with violence; and if not soon removed and placed on paper (which they stain with a deep carmine) decompose in a few minutes.

Fig. 1. CALLITHAMNION GRIFFITHSIOIDES,—*the natural size.* 2. Apex of a branch, with corymbose terminal ramuli. 3. A corymb of tetraspores from the same. 4. One of the *tetraspores* on its pedicel:—the latter figures variously *magnified.*



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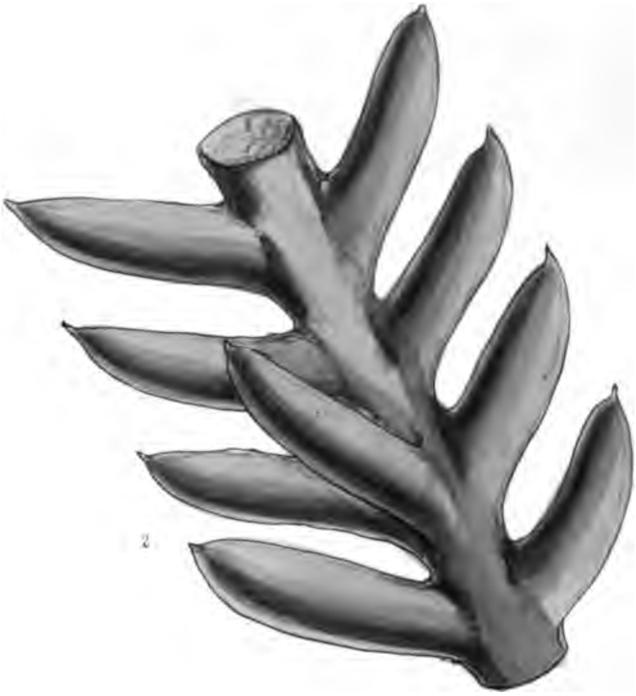


2

Vincent Brooks Imp.

PLATE CLXI.

CAULERPA DISTICHOPHYLLA, *Sond.*

GEN. CHAR. *Frond* consisting of prostrate surculi, rooting from their lower surface, and throwing up erect branches (or secondary fronds) of various shapes. *Substance* horny-membranous, destitute of calcareous matter. *Structure* unicellular, the cell continuous, strengthened internally by a spongy network of anastomosing filaments, and filled with semifluid, grumous matter. *Fructification* unknown.—CAULERPA (*Lamx.*), from *καυλος, a stem,* and *ἑρπω, to creep.*

Frons ex surculis prostratis hic illic radicantibus et ramis erectis polymorphis formata. Substantia corneo-membranacea. Structura unicellulosa, cellulæ membrana continua hyalina intus filis cartilagineis tenuissimis anastomosantibus firmata et endrochromate denso viridi repleta. Fr. ignota.

CAULERPA *distichophylla;* surculus setaceous, glabrous; fronds erect, filiform, simple or sparingly branched, closely pectinato-pinnate, with minute, subulate, distichous or subtristichous ramenta; ramenta obtuse or submucronulate, incurved, not narrowed at base.

C. distichophylla; *surculo setaceo glabro, frondibus erectis filiformibus simplicibus v. parce ramosis crebre pectinato-pinnatis, pinnis (ramentis) minutis subulatis (junioribus falcatis) distichis v. subtristichis obtusis v. mucronulatis basi non angustatis.*

CAULERPA distichophylla, *Sond. Pl. Preiss. v.* 2. *p.* 150. *Harv. Alg. Austr. Exsic. n.* 553.

CAULERPA tenella, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 564.

HAB. Western Australia, *Preiss.* On "the Jetty-reef" at Rottnest Island, rare, *W. H. H.*

GEOGR. DISTR. Western Australia.

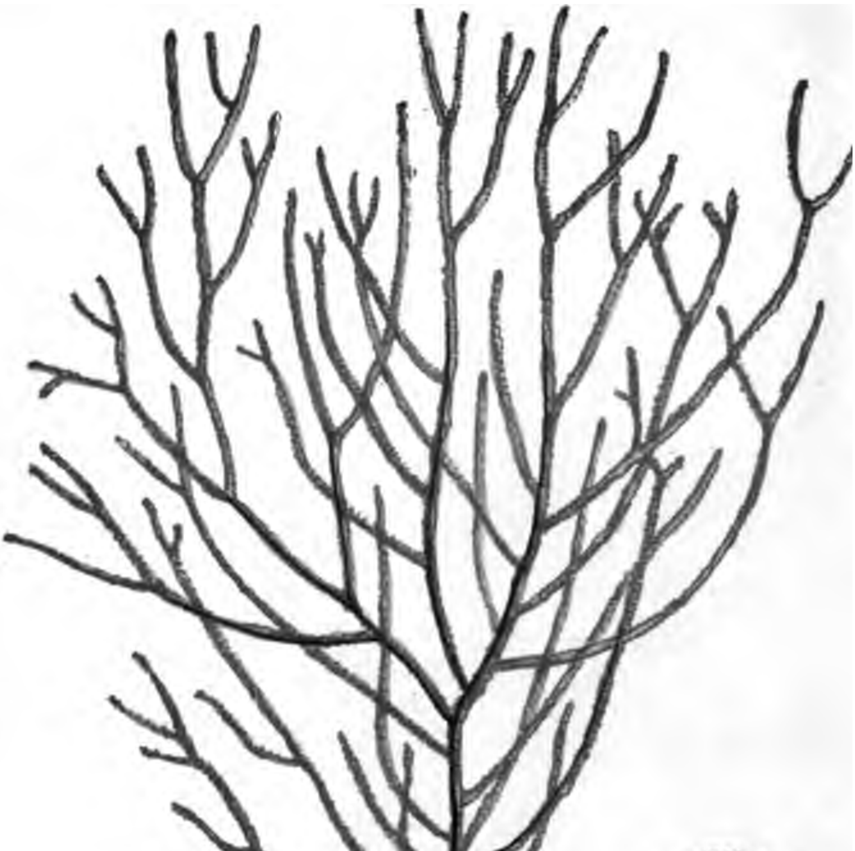
DESCR. *Surculus* 2–3 inches long, as thick or twice as thick as hog's-bristle, quite glabrous, emitting a few, slender, short roots. *Fronds* 1–3 inches high, simple or forked, or bearing 2–4 distant, alternate, lateral, undivided branches, narrow-linear in outline, closely pectinato-pinnate throughout, with very short ramenta. *Ramenta* (or pinnæ) ½–1 line long, erecto-patent, subincurved, from a broad base bluntly subulate, opposite or subalternate, either exactly distichous or irregularly tristichous, and occasionally subspirally inserted. *Colour* a dark bottle-green, glossy when dry. *Substance* horny-membranous, imperfectly adhering to paper in drying.

A small, slender, weak-growing, and decidedly a rare species.

Though named "*distichophylla,*" it has little claim, *par excellence,* to this designation; for, like many distichous *Caulerpæ,* it is liable to vary to tristichous or irregularly spiral. A slight twist in the growing stem is sufficient to destroy the perfectly distichous character; but besides this, it frequently happens (as shown at Fig. 2), that a ramentum is emitted from the middle region of the rachis, between the two distichous ramenta. Such a circumstance, occurring as it does even more commonly in several other distichous species, teaches us how worthless, as a *generic* character, the distichous or non-distichous ramentation in *Caulerpa* is:—yet on this alone it has been proposed to divide the genus.

Fig. 1. CAULERPA DISTICHOPHYLLA,—*the natural size.* 2. Part of a branch:—*magnified.*

Plate (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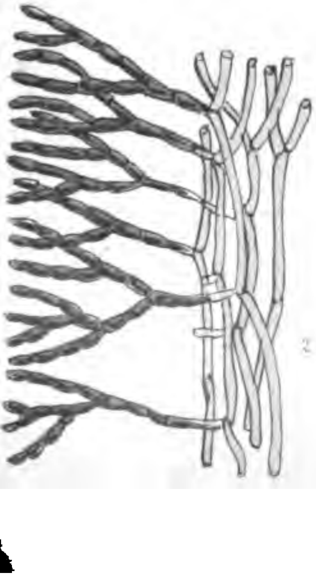
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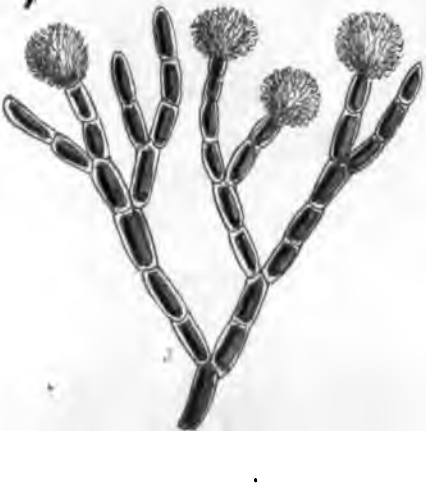
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Vincent Brooks, Imp.

Plate CLXII.

LIAGORA CHEYNEANA, *Harv.*

Gen. Char. *Frond* terete or compressed, dichotomous or pinnate, at length coated with a calcareous deposit, with a filamentous axis and continuous stratum of peripheric filaments; *axis* formed of long, branching, interlaced, longitudinal filaments; *periphery* of horizontal, articulated, moniliform, branching filaments. *Fructification* imperfectly known. —Liagora (*Lamour.*), a classical name; one of the Nereids.

Frons teretiuscula v. compressa, dichotoma v. pinnatim ramulosa, crusta calcarea demum obducta, axi stratoque peripherico continuo constituta; axis filis elongatis ramosis articulatis intricatis constans; stratum periphericum filis horizontalibus articulatis moniliformibus ramosis constitutum. Fructus vix notus.

Liagora *Cheyneana;* frond gelatinous, compressed, somewhat channelled when dry, dichotomous, much-branched; branches erecto-patent, silvery, clothed with a purple tomentum; apices diverging; peripheric filaments free, cylindrical, forked.

L. Cheyneana; *fronde gelatinosa compressa siccitate subcanaliculata dichotoma ramosissima; ramis erecto-patentibus argenteis villo purpureo tomentosis; apicibus divaricatis, filis periphericis liberis cylindraceis furcatis.*

Liagora Cheyneana, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 552. *Harv. Alg. Austr. Exsic. n.* 352.

Hab. On rocks and the smaller Algæ, within tide-marks. At Cape Riche, *W. H. H.* Fremantle, *G. Clifton.*

Geogr. Distr. Western and south-western coasts.

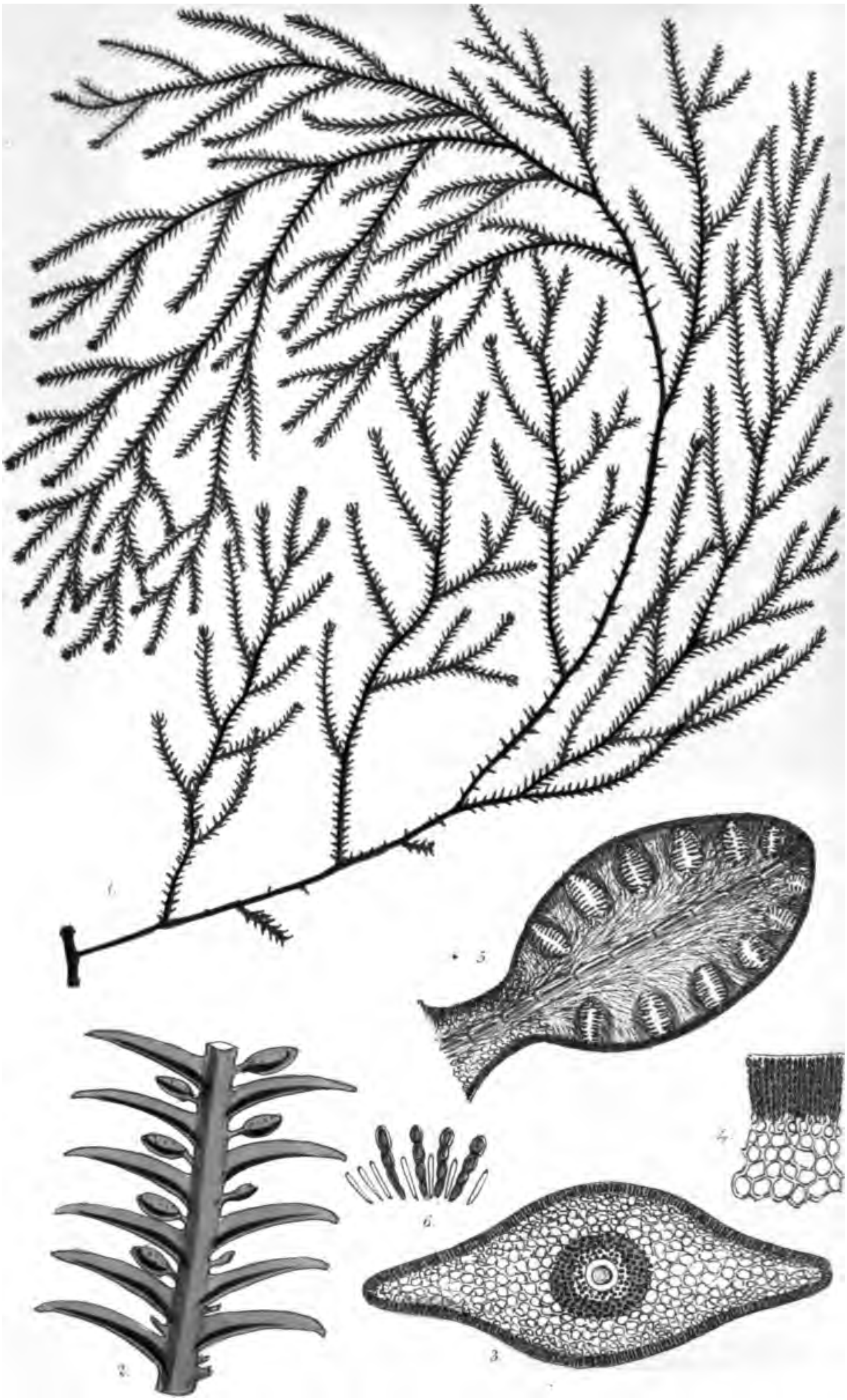
Descr. *Fronds* tufted, 3–6 inches long, ¼–1 line in diameter, subcompressed, of nearly equal diameter throughout, when dry collapsing and partly channelled, irregularly much branched, subdichotomous, rarely having any lateral branchlets. In full-grown fronds there is a more or less evident leading stem, throwing out subquadrifarious sparingly dichotomous branches; sometimes the whole frond is pretty regularly dichotomous. The *branches* are flexuous, forked at intervals of one or two inches, the axils rounded, and the apices divergent. When growing, the whole frond is of a beautiful rosy purple; the colour residing in the soft, subgelatinous, peripheric filaments, which project, as a villum, beyond the calcareous substratum of the frond. When dry, the surface is powdery and mottled, white and purplish, the silvery substratum appearing through the shrunk peripheric filaments. The peripheric filaments are subcylindrical, with joints two to three times longer than broad. Sometimes they bear at their extremities globose tufts of dichotomously much-branched, fastigiate, minute, moniliform filaments, which

may possibly contain *antheridia*. *Spores* unknown. *Colour*, when growing, purple. *Substance* gelatinous when fresh, soft and membranous when dry; in which state the frond closely adheres to paper.

The subject of our present Plate was discovered while staying at the hospitable house of George Cheyne, Esq., of Cape Riche and Albany, Western Australia, in compliment to whom and to Mrs Cheyne I have pleasure in naming it. The neighbourhood of Cape Riche is a most famous botanizing ground, as far as the exuberant and thoroughly Australian *land* Flora is concerned; but I did not find the coast equally rich in Algæ, and the present is one of the few new species which I added to my list whilst sojourning at the farm. In the genus to which it belongs it is distinguished by its unusually bright colour, and the length, freedom, and slight ramification of the peripheric filaments.

Fig. 1. LIAGORA CHEYNEANA,—*the natural size.* 2. Some of the *axile* and the *peripheric* filaments. 3. One of the peripheric filaments, bearing *antheridia*(?). 4. One of the filaments, of which the globular tuft of antheridia(?) consists:—variously *magnified.*

Plate CCXII



Vincent Brooks Imp.

Plate CLXIII.

PHACELOCARPUS LABILLARDIERI, *J. Ag.*

Gen. Char. *Frond* compressed, distichously pectinate or subterete, quadrifariously aculeate, formed of three strata surrounding a central articulate filament or tube; *medullary* stratum of longitudinal, densely interwoven filaments; *intermediate* of larger, roundish cells; *cortical* of minute, coloured, vertically seriated cellules. *Fruits* of both kinds external, pedicellate or sessile. *Cystocarps* (imperfectly known). *Receptacles* of tetraspores ovoid or globose, containing within numerous cavities parietal zonate *tetraspores* mixed with simple paranemata.—Phacelocarpus (*Endl.*), from *φακελος*, *a tuft*, or *fascis*, and *καρπος*, *fruit:* the fruit is club-shaped in the typical species.

Frons compressa, distiche pectinata, aut teretiuscula et quoquoversum aculeata, triplici strato tubum articulatum centralem ambiente contexta; strato medullari filis longitudinalibus densissime intertextis, intermedio cellulis majoribus rotundatis, corticali cellulis minutis coloratis verticaliter seriatis. Fructus utriusque generis externi, pedicellati v. sessiles. Cystocarpia (vix nota). Receptacula tetrasporarum ovoidea v. globosa, in cryptis numerosis, infra peripheriam exsculptis tetrasporas zonatim divisas parietales inter paranemata nidulantes foventia.

Phacelocarpus *Labillardieri;* frond compressed, strongly midribbed, pectinato-pinnate; pinnæ subulate, flat, twice as long as the breadth of the frond; receptacles ovoid, pedicellate, axillary.

P. Labillardieri; *fronde compressa elevato-costata pectinato-pinnata; pinnis subulatis planis latitudine frondis duplo longioribus, receptaculis ovoideis pedicellatis axillaribus.*

Phacelocarpus Labillardieri, *J. Ag. Sp. Alg. v.* 2. *p.* 648. *Sond. in Linn. v.* 25. *p.* 690. *Harv. in Hook. fil. N. Zeal. v.* 2. *p.* 242; *Fl. Tasm. v.* 2. *p.* 313. *Harv. Alg. Exsic. Austr. n.* 304.

Euctenodus Labillardieri, *Kütz. Sp. Alg. p.* 770.

Ctenodus Labillardieri, *Kütz. Phyc. Gen. p.* 407. *t.* 48. *f.* 2. *Hook. fil. et Harv. Lond. Journ. Bot. v.* 4. *p.* 549.

Fucus Labillardieri, *Mert. in Turn. Hist. t.* 137.

Sphærococcus Labillardieri, *Ag. Sp. p.* 296; *Syst. p.* 230.

Hab. In the Laminarian zone, and at greater depth. Common on the western and southern coasts of Australia, and in Tasmania.

Geogr. Distr. Australia. Tasmania. New Zealand.

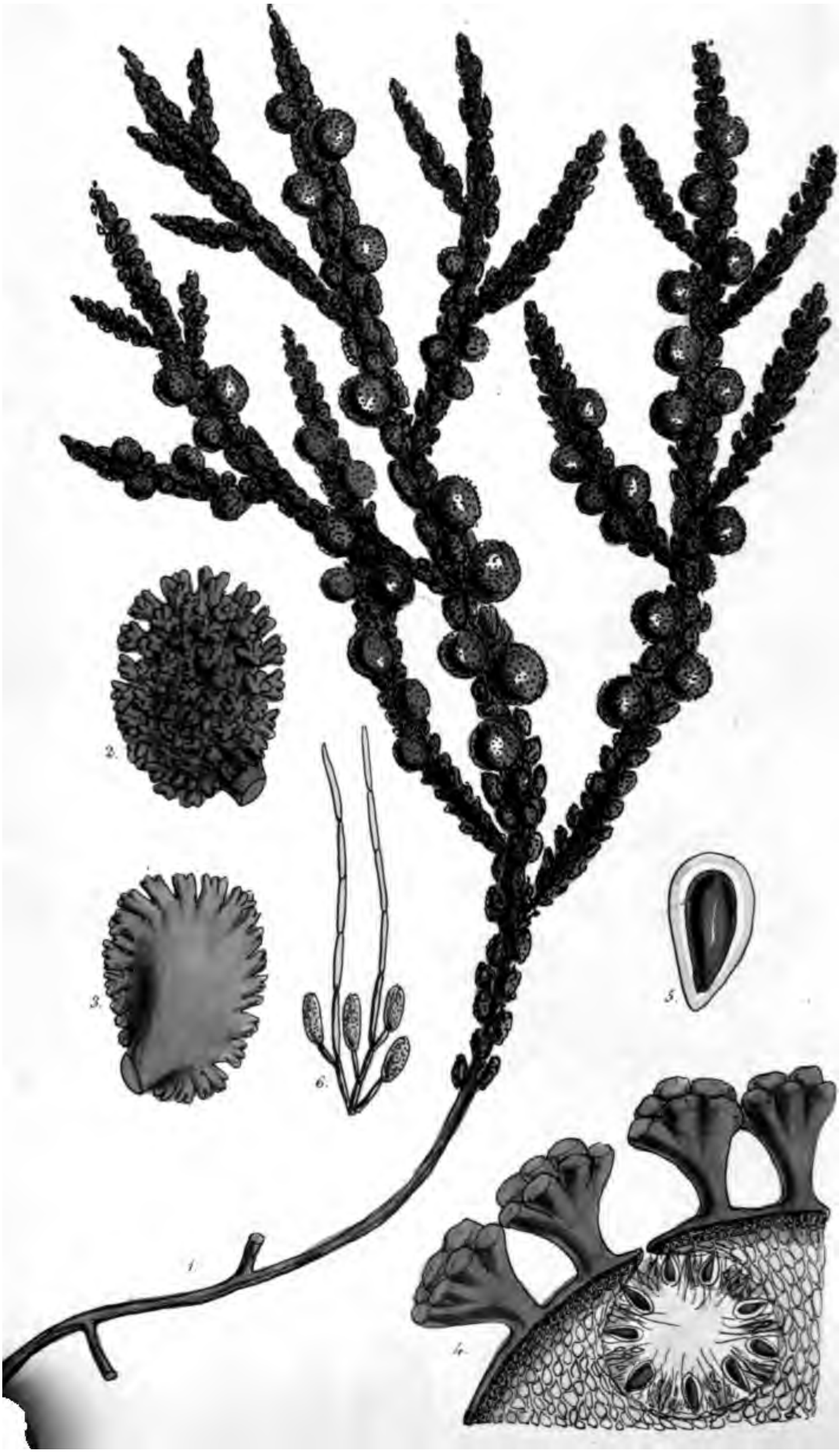
Descr. *Root* a broad disc. *Frond* 1–3 feet high or more, ½–1 line in diameter, excessively branched, distichous; branches alternate or scattered, the smaller ones more or less pinnately compound, long and short intermixed irregularly, the smaller ones more equably and closely pinnate or bipinnate. Every portion of the frond, except the denuded parts of old stems and the bases of old branches, is closely pectinated with small, subulate, distichous, flat or compressed, spreading ramuli or *cilia*, 1½–2 lines long, slightly decurrent at base. The *rachides* of the branches are thickened in the middle into a rib, which usually occupies the greater part of the width, leaving a very narrow or obsolete border. The *conceptacles* (?), as well as the *receptacles*, are axillary and pedicellate. The *conceptacles*, on all the specimens I have seen, are abortive, irregularly formed, and contain no perfect spores; they are subglobose, depressed on the summit, and often partially bivalve or irregularly gaping. *Receptacles* of tetraspores are egg-shaped, containing numerous cavities excavated under the surface-coating, and bearing on their walls attached, elongated, clavate or filiform *zonate* tetraspores, not unlike the strings of spores of a Coralline. Mixed with these are unicellular paranemata. *Colour*, when growing, a very dark red, after long immersion or exposure changing to a deep-crimson, and then scarlet and orange. *Substance* very firm, cartilagineo-corneous, rigid when dry. In drying, the frond does not adhere to paper.

* * *

A well-known and abundant Alga along all the extratropical coasts of Australia, agreeing in ramification and general habit with several others, but readily known from all by its very curious fructification. I have abstained from figuring what are called conceptacles (*cystocarps*) in this genus, because I am by no means assured that they really are cystocarps, and because I think they may probably be only abortive receptacles, or perhaps antheridia-cups. In the many specimens I have examined I have never found well-developed spores, and very frequently only an amorphous mass of tissue. It may perhaps be questioned whether the *receptacles* themselves may not be true cystocarps, and the so-called *tetraspores*, strings of spores similar to the quaternate spores of *Corallina*. Were this view admitted, the affinities of *Phacelocarpus* would be with the *Gelidiaceæ*. At present it is quite uncertain to what family this genus should be referred.

Fig. 1. PHACELOCARPUS LABILLARDIERI; a branch,—*the natural size*. 2. Small fragment of a branch, in fruit. 3. Cross section of the stem. 4. Small fragment of the periphery of the same. 5. Longitudinal section through a *receptacle*, showing many tetraspore-cavities. 6. *Tetraspores* and *paranemata* from the same:—variously *magnified*.

Plate CI



Vincent Brooks Imp.

PLATE CLXIV.

SCABERIA AGARDHII, *Grev.*

GEN. CHAR. *Frond* dendroid, irregularly branched, having stem, leaves, and vesicles as distinct organs, but without receptacles. *Leaves* peltate, fleshy, warted externally, spirally inserted round the stem. *Vesicles* formed from an inflated leaf, and inserted as the leaves. *Scaphidia* immersed in the leaves, beneath the periphery of the outer surface, hermaphrodite. *Spores* obovoid. *Antheridia* tufted.—SCABERIA (*Grev.*), from *scaber*, rough: alluding to the roughly-warted leaves and vesicles.

Frons dendroidea, vage ramosa, caulem, folia, et vesiculas ut organa discreta gerens, receptaculis propriis nullis. Folia peltata, carnosa, externe spinuloso-verrucosa, spirali ordine circa caulem disposita. Vesiculæ a folio inflato ortæ, ut folia insertæ. Scaphidia foliis immersa, infra superficiem paginæ exterioris excavata, hermaphrodita. Sporæ obovoideæ. Antheridia fasciculata.

SCABERIA *Agardhii.*

SCABERIA Agardhii, *Grev. Syn. p.* 36. *J. Ag. Sp. Alg. v.* 1. *p.* 252. *Sond. Preiss. Pl. v.* 2. *p.* 159. *Harv. in Hook. fil. Fl. Tasm. v.* 2. *p.* 283; *Alg. Austr. Exsic. n.* 31.

CASTRALTIA salicornioides, *A. Rich. N. Zeal. v.* 2. *p.* 143.

HAB. Below low-water mark, extending to 10–20 fathoms. Common on the western and southern shores of Australia, and in Tasmania.

GEOGR. DISTR. Australia. Tasmania. New Zealand.

DESCR. *Root* discoid. *Frond* several feet long, irregularly or alternately much branched. The lower part of the stem and of the older branches is denuded of leaves, smooth, filiform, as thick as whipcord, flexuous or wavy. The upper portion, and all the younger branches and their subdivisions, are closely imbricated with small, fleshy, densely-warted leaves. These leaves are affixed to slightly excentrical petioles, spirally inserted round the stem; they are 2–4 lines in diameter, vertically compressed, smooth on their inner or lower side, and closely covered with short, wart-like processes on the upper. The *vesicles* are spherical, covered like the leaves with warts, 3–4 lines in diameter, sessile along the sides of branches or ramuli. *Spore-cavities* are lodged in the ordinary leaves, under the surface; they contain *spores* and tufted *antheridia*, and open among the bases of the warts. The *colour* is a very dark brown, becoming rather darker in drying. The *substance* is rigid and tough, somewhat wiry in the stem; brittle when dry.

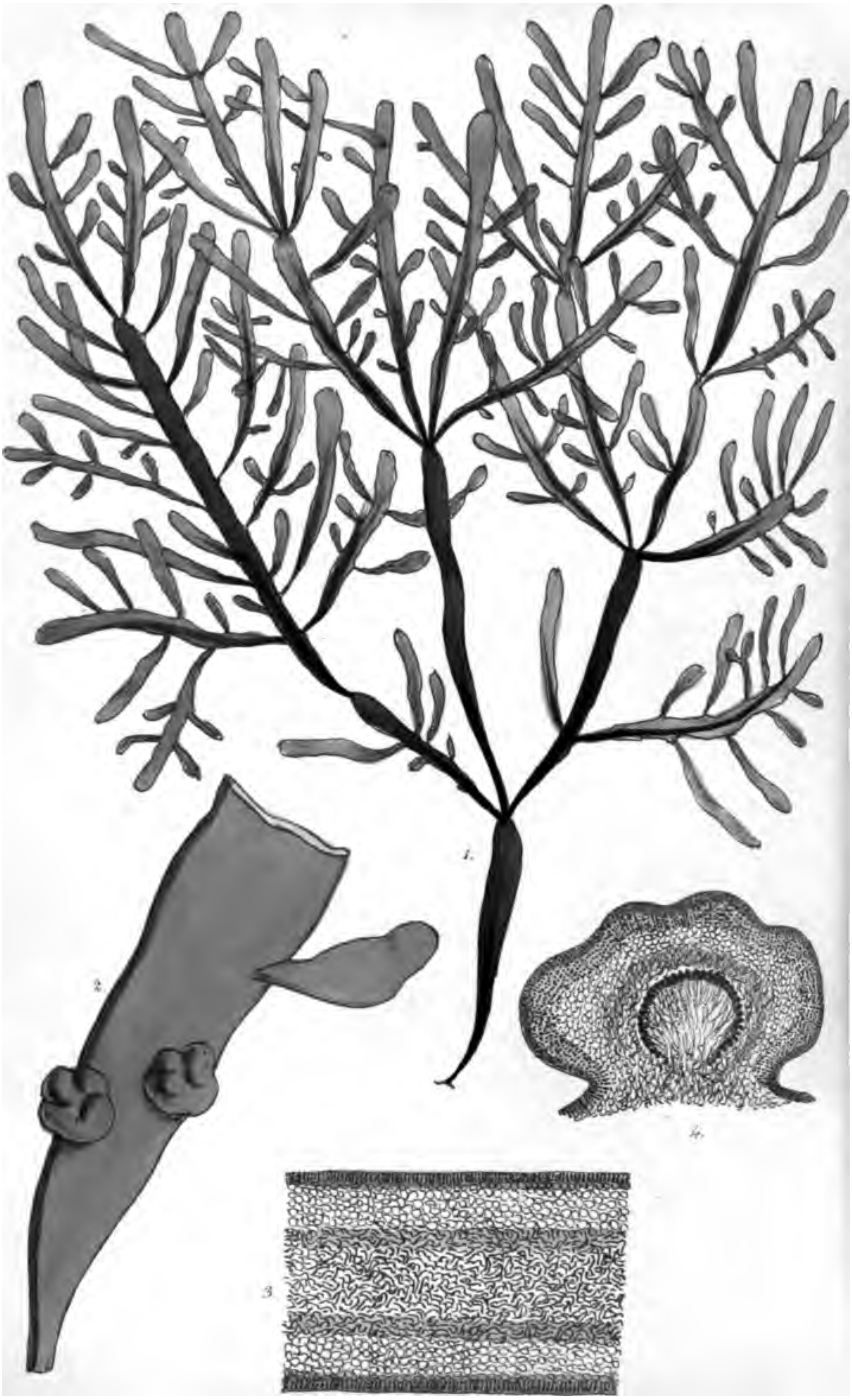
This is by much the most singular and characteristic of the

Australian Fucoids. In external habit it not a little resembles one of the Gorgonioid corals, but examination at once shows its strict relationship to several Fucoids. In the peltate leaves there is a manifest affinity with *Turbinaria,* and in the fructification with *Carpoglossum;* to neither of which genera does *Scaberia* bear much external resemblance. Among the Algæ perhaps that are externally similar none approach nearer than *Polyphacum* and *Thamnoclonium,* both genera of "*Rhodospermeæ,*" and therefore widely removed in affinity, however similar they may be in development of the frond, or processes of the surface.

This is one of the Algæ which appears to be always in fruit; at least, in the many specimens which have passed through my hands, I have never failed to find spore-cavities, either filled with spores and antheridia, or having just discharged their contents.

Fig. 1. SCABERIA AGARDHII,—*the natural size.* 2. Front view of a peltate leaf. 3. Back view of the same. 4. Section through the upper surface of a fertile leaf. 5. A spore. 6. Some antheridia,—variously *magnified.*

Plate II



Vincent Brooks Imp.

Ser. RHODOSPERMEÆ. Fam. *Gelidiaceæ ?*

PLATE CLXV.

NIZYMENIA AUSTRALIS, *Sond.*

GEN. CHAR. *Frond* horny-membranous, linear, subpinnately compound, composed of three strata; the medullary of densely interwoven, anastomosing filaments; the intermediate of roundish-angular cells; the cortical of minute, coloured cellules. *Fructification:* 1, sessile, thick-walled, wrinkled or irregular *cystocarps,* containing minute, subseriated spores, radiating from a central, basal, fibro-cellular placenta.—NIZYMENIA (*Sond.*), unexplained.

Frons corneo-membranacea, linearis, pinnatim decomposita, stratis tribus fere constans; strato medullari filis tenuibus longitudinalibus intertextis anastomosantibus, intermedio cellulis rotundato-angulatis, corticali cellulis minimis coloratis conflato. Fruct.: 1, "*cystocarpia in disco frondis sparsa, sessilia, globosa, rugulosa, v. sublobata, demum poro pertusa, gemmidia minuta subangulata e placentâ centrâli basifixâ elevatâ radiantia.*" (*Sond.*)

NIZYMENIA *australis,* Sond.

NIZYMENIA australis, *Sond. in Linn. v.* 26. *p.* 521. *Harv. in Hook. fil. Fl. Tasm. v.* 2. *p.* 315.

ARESCHOUGIA conferta, *Harv. Alg. Exsic. n.* 385, *ex parte.*

HAB. Wilson's Promontory, *Dr. Ferd. Mueller.* Port Phillip Heads, *W. H. H., T. E. Rawlinson.* Southport, Tasmania, *C. Stuart.*

GEOGR. DISTR. South coast of Australia. Tasmania.

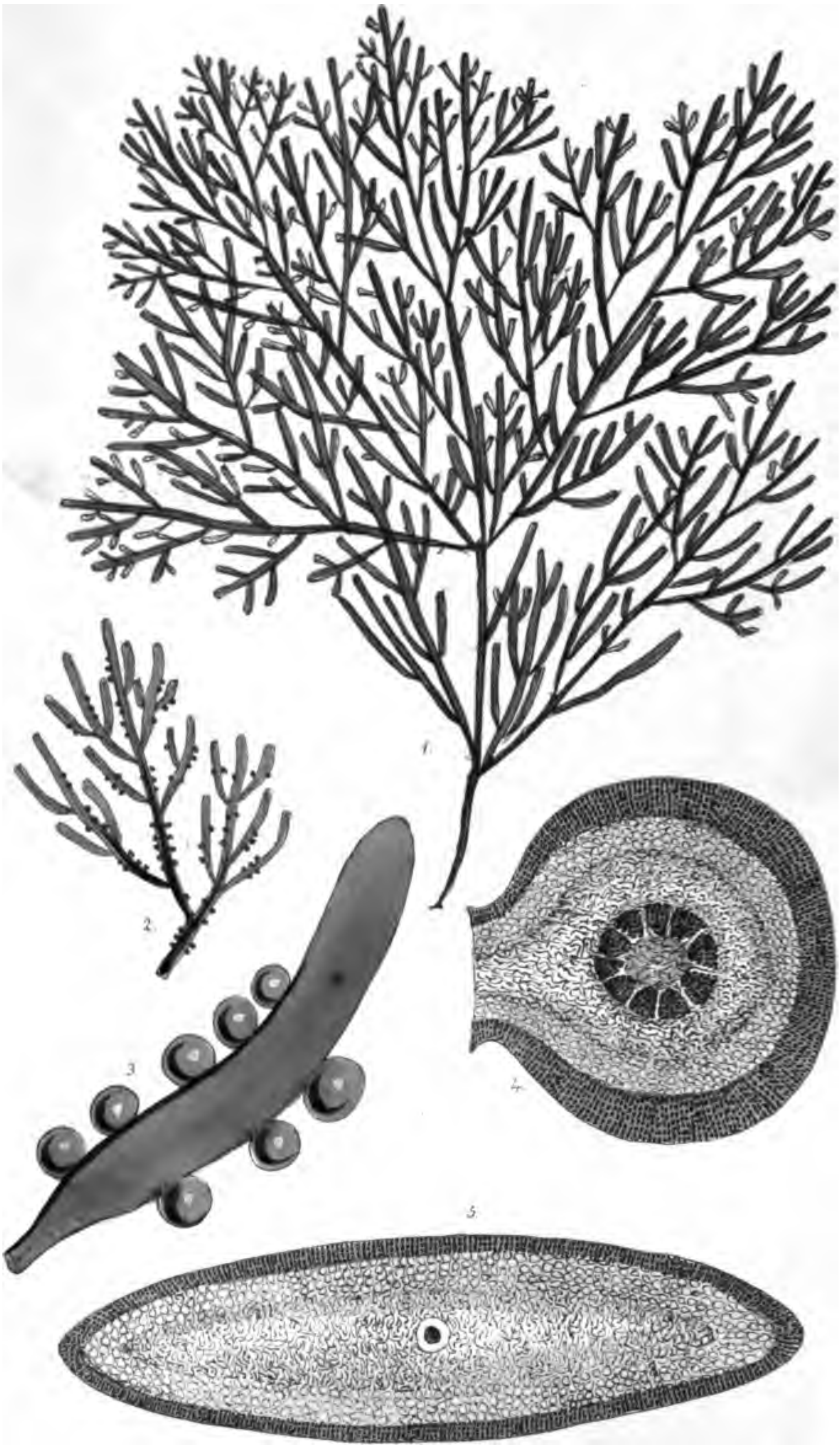
DESCR. *Root* a callus, ½–¾ inch broad. *Fronds* solitary or tufted, 6–10 inches high, and as much or more in the expansion of the branches, linear or strap-shaped, 1½–2 lines wide, flat, distichous, the primary divisions irregular, the secondary pinnately decompound. *Branches* subsimple, tapering at base and much constricted at the insertion, 3–6 inches long, irregularly beset with marginal pinnæ, which are sometimes crowded together, sometimes distantly inserted. The *pinnæ* are generally naked in the lower half, and furnished in the upper with several subopposite, similar but smaller pinnules; these latter are either simple, or bear a third series of much smaller pinnules. All the divisions taper to the base, and are blunt at the extremity. *Cystocarps* irregular in outline, scattered on the disc of the smaller segments, very dense in structure, containing a central nucleus formed of filaments that bear minute spores at their extremities (exact structure not clearly ascertained). *Colour* a bright blood-red, well preserved in drying. *Substance* rigid, tough, and almost horny when dry. In drying it does not adhere to paper.

In the general habit and in the structure of the frond this plant well agrees with most of the *Gelidiaceæ:* but if the *cystocarps* above described be normal, and fully developed, they scarcely exhibit the cystocarpic structure proper to that family, and rather indicate an affinity with *Rhodymeniaceæ.* I have only seen fruit on a small fragment, communicated by my friend Sonder, and none of the cystocarps cut through by me appeared to be fully organized.

In its mode of branching, colour, and substance, *Nizymenia australis* so closely resembles *Areschougia conferta,* figured in our next Plate, that I formerly took it for a broad variety of that Alga, and distributed specimens of it as such.

Fig. 1. NIZYMENIA AUSTRALIS,—*the natural size.* 2. Part of a small branch, with *conceptacles.* 3. Vertical section of a conceptacle. 4. Transverse section of the frond:—the latter figures variously *magnified.*

Plate CLXI.



Vincent Brooks, Imp.

PLATE CLXVI.

ARESCHOUGIA CONFERTA, *Harv.*

GEN. CHAR. *Frond* compressed or filiform, vaguely branched, composed of an articulated axial filament, and three (rarely but two) strata of cells; *medullary* stratum consisting of longitudinal, anastomosing, interwoven filaments; the *intermediate* (sometimes absent) of several rows of roundish, coloured cells; the *cortical* of minute, vertically seriated cellules. *Fructification:* 1, *conceptacles* immersed in the frond, very rarely external, suspended among the filaments of the medullary stratum, and enclosed in a network of filaments, opening by an external pore, and containing moniliform strings of spores, radiating from a central placenta; spores roundish; 2, zonate *tetraspores,* formed on the cortical stratum of the ramuli.—ARESCHOUGIA (*Harv.*), in honour of Dr. J. E. Areschoug, Professor of Botany at Upsal, a distinguished algologist.

Frons compressa v. filiformis, vage ramosa, immerse costata, e filo centrali articulato et stratis fere tribus cellularum constituta. Stratum medullare e filis articulatis longitudinalibus anastomosantibus intertextis; intermedium (nunc deficiens) e cellulis rotundatis majusculis pluriseriatis, corticale e cellulis minimis verticalibus formatum. Fruct.: 1, *cystocarpia fronde immersa, rarissime externa, inter fila strati medullaris suspensa, reticulo filorum velata, carpostomio demum aperta, fila sporifera moniliformia a placenta centrali emissa continentia; sporæ subrotundæ;* 2, *tetrasporæ zonatim divisæ, inter cellulas corticales ramulorum nidulantes.*

ARESCHOUGIA *conferta;* frond terete at base, compressed and flattened upwards, obscurely midribbed, densely much branched, fastigiate; branches narrow-linear, pinnately decompound, entire; conceptacles *external,* marginal, globose.

A. conferta; *fronde basi tereti sursum compresso-applanata et subcostata dense ramosissima fastigiata; ramis anguste linearibus pinnatim decompositis margine integerrimis; cystocarpiis externis marginalibus globosis.*

HAB. Swan River, *Mylne, W. H. H., G. Clifton.* South Australia, *Dr. Curdie.* Warnambool, *H. Watts.*

GEOGR. DISTR. Western and southern coasts of Australia.

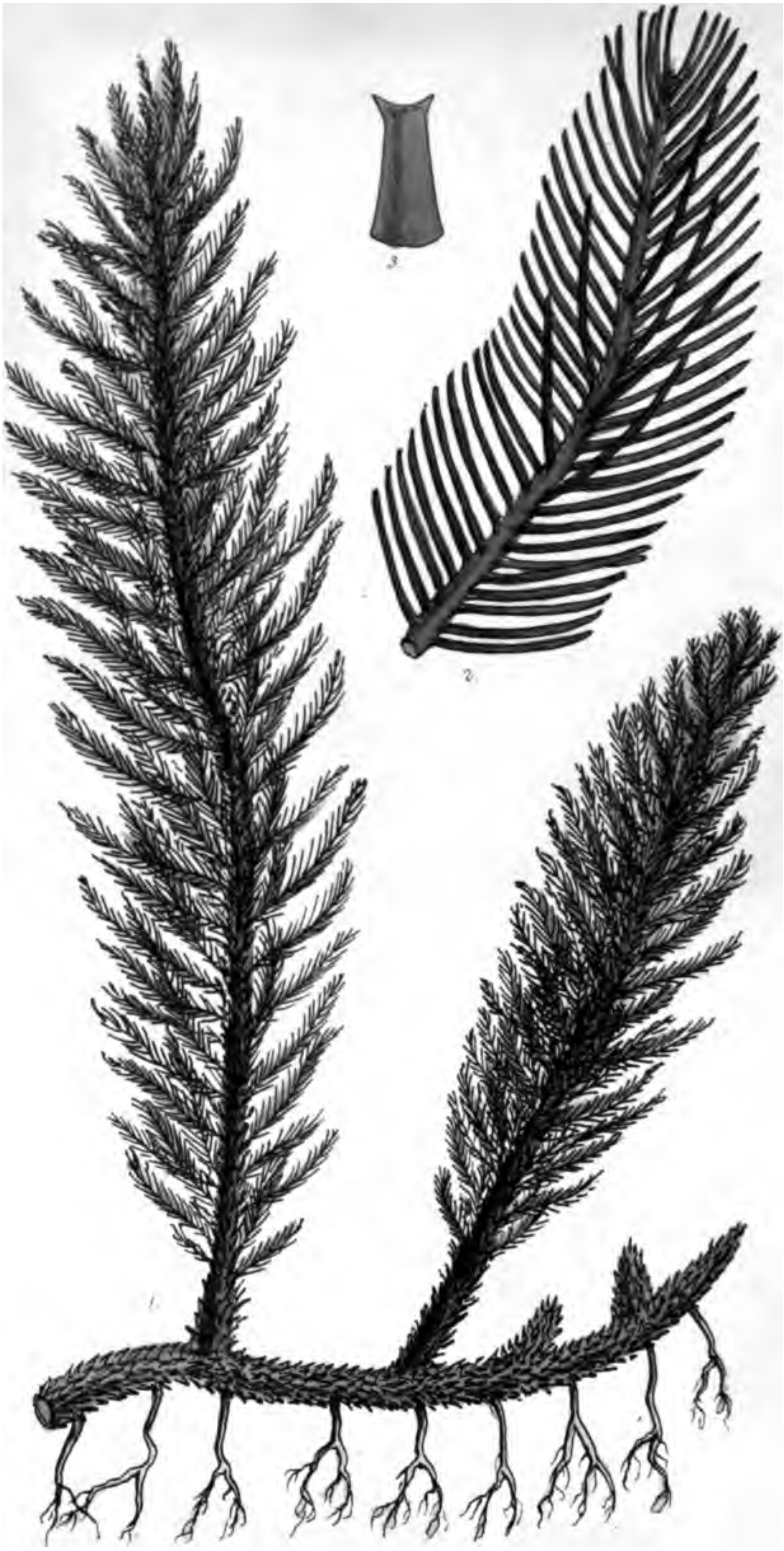
DESCR. *Root* an expanded callus. *Fronds* tufted, 4–6 inches high, somewhat flabelliform in outline, fastigiate, much-branched from the base, and very dense. The *branches* and their divisions are a line or less in breadth, tapering to the base, linear throughout their greater length, and generally blunt at the apex. Except near the base the narrow frond is everywhere flattened;

the upper divisions are more or less perfectly midribbed; the ultimate ramuli narrower and ribless. The *ramification* is distichous, and more or less pinnate, the pinnæ in 3–4 series, all naked at base, and pinnated only in the upper half. The axils are narrow and sharp, and the branches erect. The *cystocarps*, nearly the size of poppy-seed, are marginal, and formed in abundance on the fertile specimens: they are very convex, nearly spherical, constricted at base. The *colour* is a deep blood-red, either preserved or becoming darker in drying; when exposed to the air it brightens, and may become scarlet or orange if the exposure be continued. The *substance* is very rigid and horny, and in drying the plant does not adhere to paper.

This most resembles a dwarf and densely branched state of *A. australis* (Plate XIII.), but essentially differs, besides other characters, in the *external*, marginal cystocarps, so distinct in appearance (though not in essential structure) from the *immersed* cystocarps of *A. australis* and other species. There is also a striking resemblance in habit to *Nizymenia australis* (see Plate CLXV.); but the frond in our present plant is never so broad, and is generally more densely branched; and the *Nizymenia* wants the axile filament which is found in all species of *Areschougia*. A cross section of a branch therefore will always enable the student to determine which of these two similar-looking plants he has got hold of.

Fig. 1. Areschougia conferta. 2. Part of a frond in fruit:—both of the *natural size*. Fig. 3. A branchlet, in fruit. 4. Vertical section of a conceptacle. 5. Cross section of the frond:—*magnified*.

Plate XIII



Vincent Brooks Imp.

PLATE CLXVII.

CAULERPA SONDERI, *Muell.*

GEN. CHAR. *Frond* consisting of prostrate surculi, rooting from their lower surface, and throwing up erect branches (or secondary fronds) of various shapes. *Substance* horny-membranous, destitute of calcareous matter. *Structure* unicellular, the cell continuous, strengthened internally by a spongy network of anastomosing filaments, and filled with semifluid, grumous matter. *Fructification* unknown.—CAULERPA (*Lamx.*), from *καυλος, a stem,* and *ἑρπω, to creep.*

***Frons** ex surculis prostratis hic illic radicantibus et ramis erectis polymorphis formata. **Substantia** corneo-membranacea. **Structura** unicellulosa, cellulæ membrana continua hyalina intus filis cartilagineis tenuissimis anastomosantibus firmata et endochromate denso viridi repleta. **Fr.** ignota.*

CAULERPA *Sonderi;* surculus robust, densely covered with cylindrical, forked scales; frond erect, scaly, oblong, densely beset on all sides with short, slender branches; branches pectinato-pinnate; pinnules very close, alternate, distichous (sometimes irregular), linear-filiform, bimucronulate.

C. Sonderi; *surculo crasso squamulis cylindraceis furcatis dense obsesso; fronde erecta squamosa oblonga quaquaversum densissime ramosa, ramis tenuibus brevibus pectinato-pinnatis, pinnulis crebris alternis distichis (nunc vagis) lineari-filiformibus bimucronulatis.*

CAULERPA Sonderi, *F. Muell. in Linn.* 1852, *p.* 661. *Sond. in Linn. v.* 26. *p.* 507.

CAULERPA obscura, *Sond. in Pl. Preiss. v.* 2. *p.* 150. *Kütz. Sp. Alg. p.* 497. *Fl. Tasm. v.* 2. *p.* 337.

CAULERPA splendida, *Grev. in An. Mag. Nat. Hist. ser.* 2. *v.* 14. *p.* 127. *t.* 10.

HAB. Western Australia, *Preiss.* Abundant; Rottnest and Garden Islands, and at King George's Sound, *W. H. H.*, *Geo. Clifton.* Lefèbre Peninsula, *Dr. Mueller.* S. Australia. *Dr. Curdie.* Port Fairy, Port Phillip Heads, and Western Port, *W. H. H.* Bass's Straits, *Mr. J. E. Cox.* Tasmania, *R. Gunn.*

GEOGR. DISTR. Western and southern shores of Australia. Tasmania.

DESCR. *Surculus* 6–12 inches long, 2–3 lines in diameter, emitting many long, much branched roots, and densely clothed on all sides with coarse, rigid, forked or bipartite scales. Similar scales clothe the lower part of the stem, or stipes, and gradually lengthen out into branches upwards. The outline of the frond is narrow-oblong. The *branches* are very closely crowded in some, more laxly in other specimens, they are 1–1½ inch long, and closely

pectinated with distichous, or rarely sub-tetrastichous, alternate, filiform pinnules. The apices of the pinnules are minutely bimucronulate. The *colour* is dark lurid-green. The *substance* is soft, flaccid when recent, and the plant, in drying, adheres pretty firmly to paper.

Authentic specimens of *C. obscura*, Sond., prove that that species was founded on very small and dense-growing individuals of what Mueller many years subsequently called *C. Sonderi;* and, according to the strict rules of priority, I ought to have retained Sonder's specific name "*obscura*" (used in the sense of "*dark-coloured*"), in preference to the much more modern "*Sonderi*" of Mueller. Some hundreds of specimens collected by me at King George's Sound, and on other parts of the Australian coast, have enabled me to trace the connection between the two extreme forms which alone were known to Sonder and Mueller; and as the state described as "*obscura*" very inadequately answers to the *ordinary* condition of the species, while that called "*Sonderi*" comprises all well-grown individuals, I feel at liberty, in uniting the two, to choose the latter name, though the newest. The still newer, though *nearly* contemporaneous name, "*splendida*," of Greville, however appropriate, must be considered a synonym.

In our fig. 2 the pinnules are represented as more closely set and less decidedly alternate than they very frequently occur; but different individuals differ greatly in the closeness or distance of the pinnules.

Fig. 1. CAULERPA SONDERI,—*the natural size*. 2. Upper half of a branch. 3. Apex of one of the pinnules:—the two latter figures variously *magnified*.

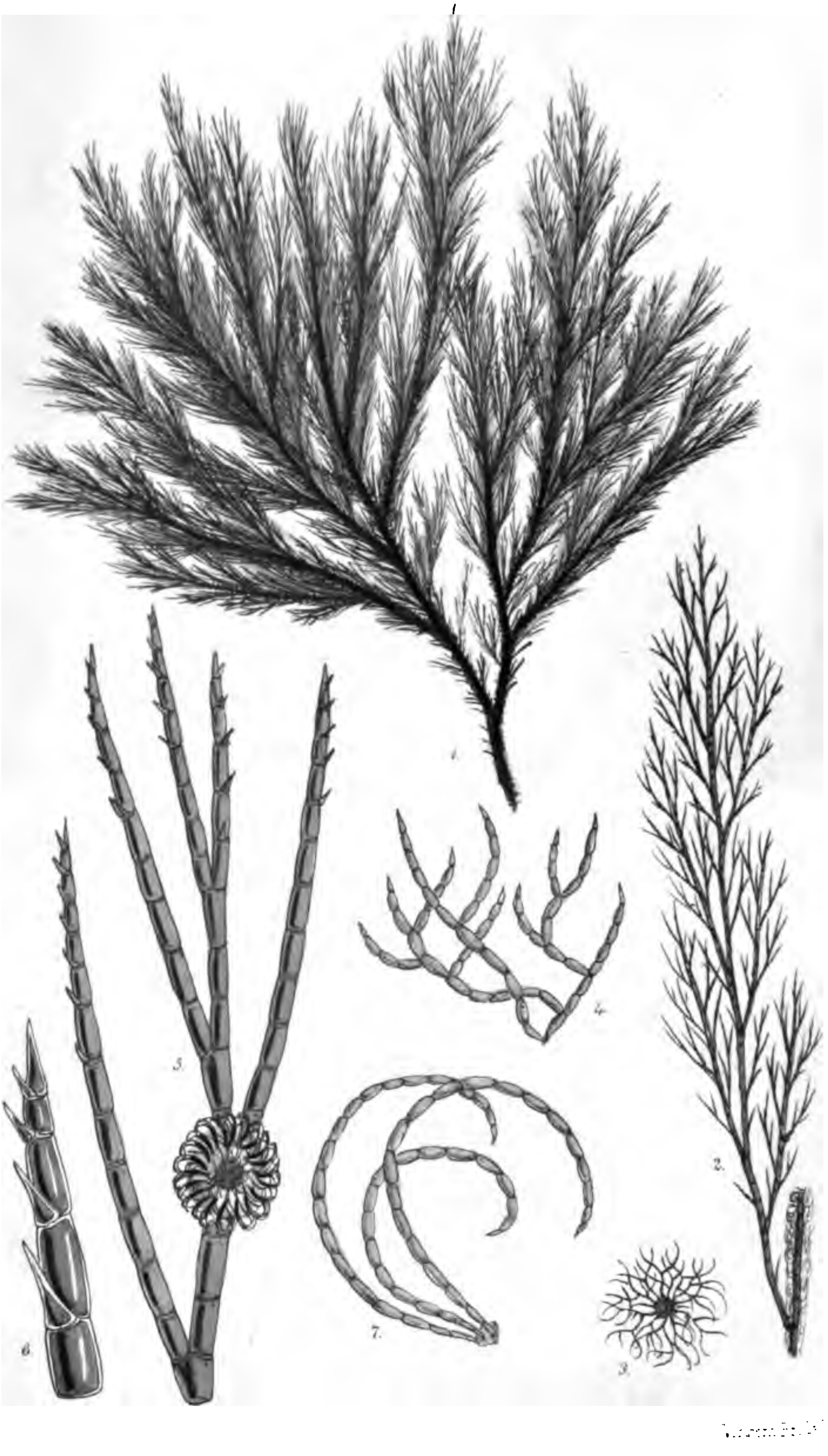

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PLATE CLXVIII.

BALLIA SCOPARIA, *Harv.*

GEN. CHAR. *Frond* filiform, rigid, dendroid; the stem and branches covered with a plexus of hair-like, short fibres; ramuli pellucidly articulate, pinnately decompound. *Fructification:* 1, involucrate *favellæ* terminating short pinnæ, and containing numerous angular spores; 2, *tetraspores* borne on the hair-like fibres of the stem and branches. —BALLIA (*Harv.*), in honour of Miss Anne E. Ball, a distinguished Irish algologist.

Frons filiformis, rigida, dendroidea; caulis ramique plexu filorum brevium quasi hirsuti; ramuli pellucide articulati, pinnatim compositi. Fruct.: 1, *favellæ involucratæ in pinnula abbreviata terminales, sporas numerosas angulatas foventes;* 2, *tetrasporæ triangule divisæ, in filis caulinis evolutæ.*

BALLIA *scoparia;* lesser branches and ramuli alternate, very erect, irregularly subpinnate; ramuli scattered or secund, subulate, very acute, often secundly spinigerous toward the extremity; articulations cylindrical, about thrice as long as broad.

B. scoparia; *ramis minoribus ramulisque alternis adpressis vage subpinnatis, ramulis sparsis secundisve subulatis acutissimis apicem versus sæpissime secunde spinuligeris; articulis diametro subtriplo longioribus.*

BALLIA scoparia, *Harv. Alg. Austr. Exsic. n.* 502. *Harv. in Hook. fil. Fl. Tasm. v.* 2. *p.* 333.

CALLITHAMNION scoparium, *Hook. fil. and Harv. in Lond. Journ. v.* 4. *p.* 173; *Fl. Ant. v.* 2. *p.* 490. *t.* 189. *f.* 3; *Fl. N. Zeal. v.* 2. *p.* 259.

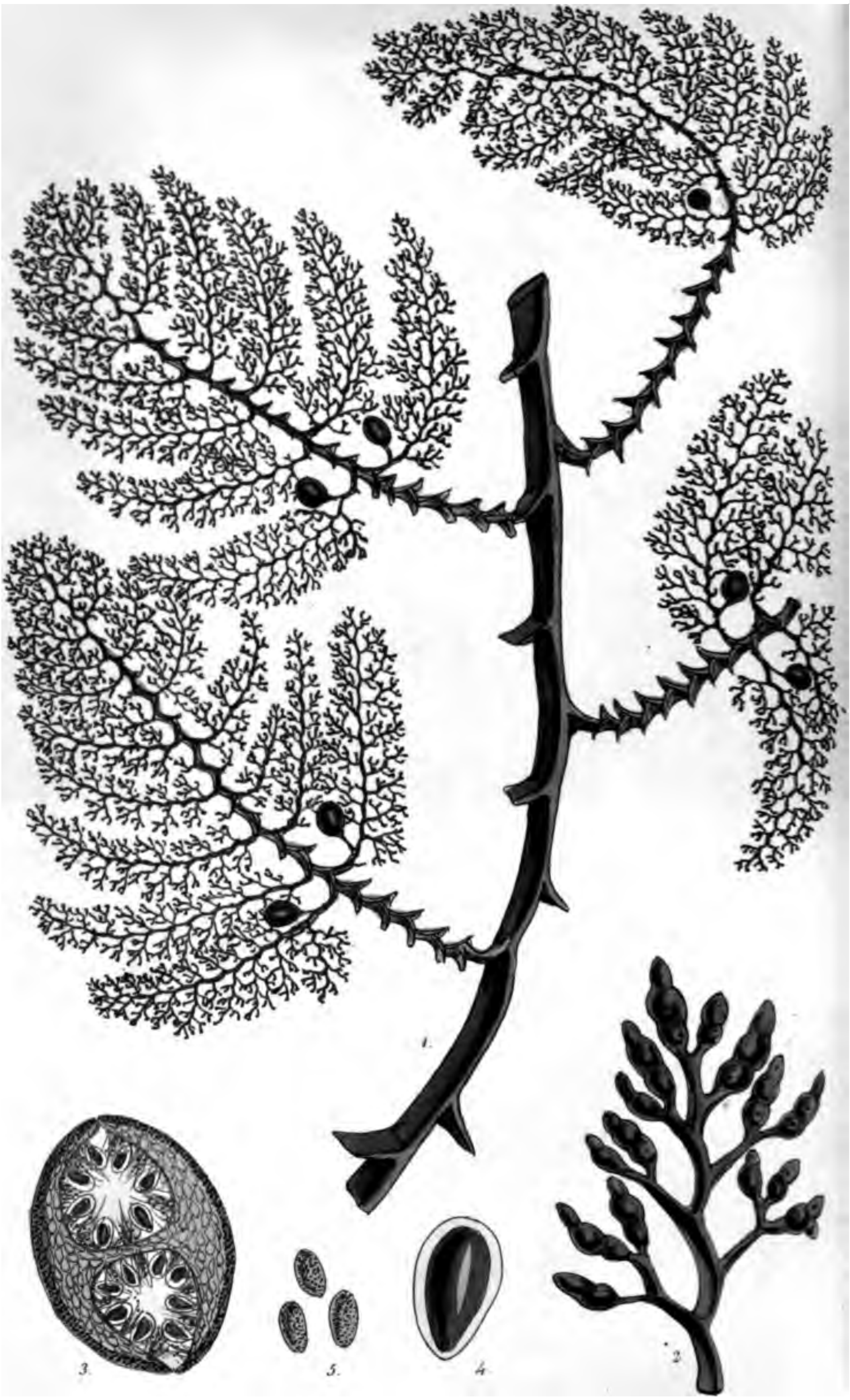
HAB. Port Fairy, Port Phillip Heads, Western Port, *W. H. H.* Wilson's Promontory, *Dr. Mueller.*

GEOGR. DISTR. Falkland Islands and Cape Horn. New Zealand. Tasmania.

DESCR. *Root* stupose. *Fronds* densely tufted, 3–8 inches long, flabellately much branched, fastigiate. The stem and primary branches are subdichotomous, rope-like, and densely clothed with short, curled, irregularly divided, hair-like ramelli, not ½ line long. The lesser branches (penultimate or plumules) are pellucidly articulate, naked, crowded, or subdistant, ½–1 inch long, very erect, irregularly bipinnate or subtripinnate; the pinnæ and pinnules are alternate, very erect, subulate, tapering to a fine point, and very often furnished near the extremity with several unilateral subulate spines. The articulations are pretty generally thrice as long as broad. *Involucres* sessile on the sides of the lesser branches (plumules), composed of very numerous, incurved, whorled ramuli. No *favellæ* found in the specimens examined. *Tetraspores* unknown. *Colour* a very dark brownish-purple, rather deepening in drying. *Substance* rigid. It scarcely adheres to paper in drying.

The specific name *scoparia* is given to this species partly because its tufted branches, crowded with straight and rigid ramuli do resemble *brooms;* and partly because the whole aspect of the plant, colour alone excepted, is that of *Sphacelaria scoparia,*—a northern species, much like the Australian *S. paniculata.* From all other known *Balliæ* this differs in the alternate insertion of the ramuli, and in the very imperfectly pinnate condition of the penultimate branches. The fruit is scarcely known, but so far as known it agrees with that of the other species; and the substance and colour of the frond and the clothing of the main filaments are those of *Ballia callitricha.* It is the least beautiful of the genus.

Fig. 1. BALLIA SCOPARIA,—*the natural size.* 2. A penultinate branch. 3. Section of the stem, with its stupose fibres. 4. One of the fibres. 5. Ramuli, with an involucre. 6. Apex of a ramulus. 7. Some of the involucral filaments:—*magnified.*



Vincent Brooks Imp

PLATE CLXIX.

CYSTOPHORA BROWNII, *J. Ag.*

GEN. CHAR. *Root* scutate. *Frond* pinnately decompound, dendroid, with a distinct stem, branches, and ramuliform leaves. *Vesicles* stipitate, simple, rarely absent. *Receptacles* pod-like, torulose, or moniliform, developed in the ramuli. *Scaphidia* hermaphrodite. *Spores* obovoid. —CYSTOPHORA (*J. Ag.*), from *κυστις, a bladder,* and *φορεω, to bear.*

> ***Radix scutata. Frons pinnatim decomposita, dendroidea, caule proprio, ramis foliisque ramuliformibus donata. Vesiculæ stipitatæ, simplices, raro nullæ. Receptacula siliquæformia, torulosa v. nodulosa, apice ramulorum evoluta. Scaphidia hermaphrodita.***

CYSTOPHORA *Brownii;* stem flat, decompound pinnate; pinnæ issuing from the flat side of the stem, bent down at their insertion; pinnules dichotomo-pinnate, the ultimate ramuli formed into minute, ovato-lanceolate, torulose receptacles; vesicles few, obovoid-spherical.

C. Brownii; ***caule plano decomposito-pinnato; pinnis a latere plano caulis egredientibus retrofractis; pinnulis dichotomo-pinnatis, ultimis in receptacula ovato-lanceolata torulosa abeuntibus; vesiculis raris obovoideo-sphæricis.***

CYSTOPHORA Brownii, *J. Ag. Sp. Alg. v.* 1. *p.* 241. *Harv. Alg. Austr. Exsic. n.* 3.

CYSTOSEIRA Brownii, *Ag. Sp. Alg. p.* 73; *Syst. p.* 288. *Bory, Voy. Coq. n.* 33. *Sond. in Lehm. Pl. Preiss. v.* 2. *p.* 159.

FUCUS Brownii, *Turn. Hist. Fuc. t.* 197.

HAB. Shores of Western Australia, *Menzies!, Brown, Preiss!, Mylne!* King George's Sound, *W. H. H.*

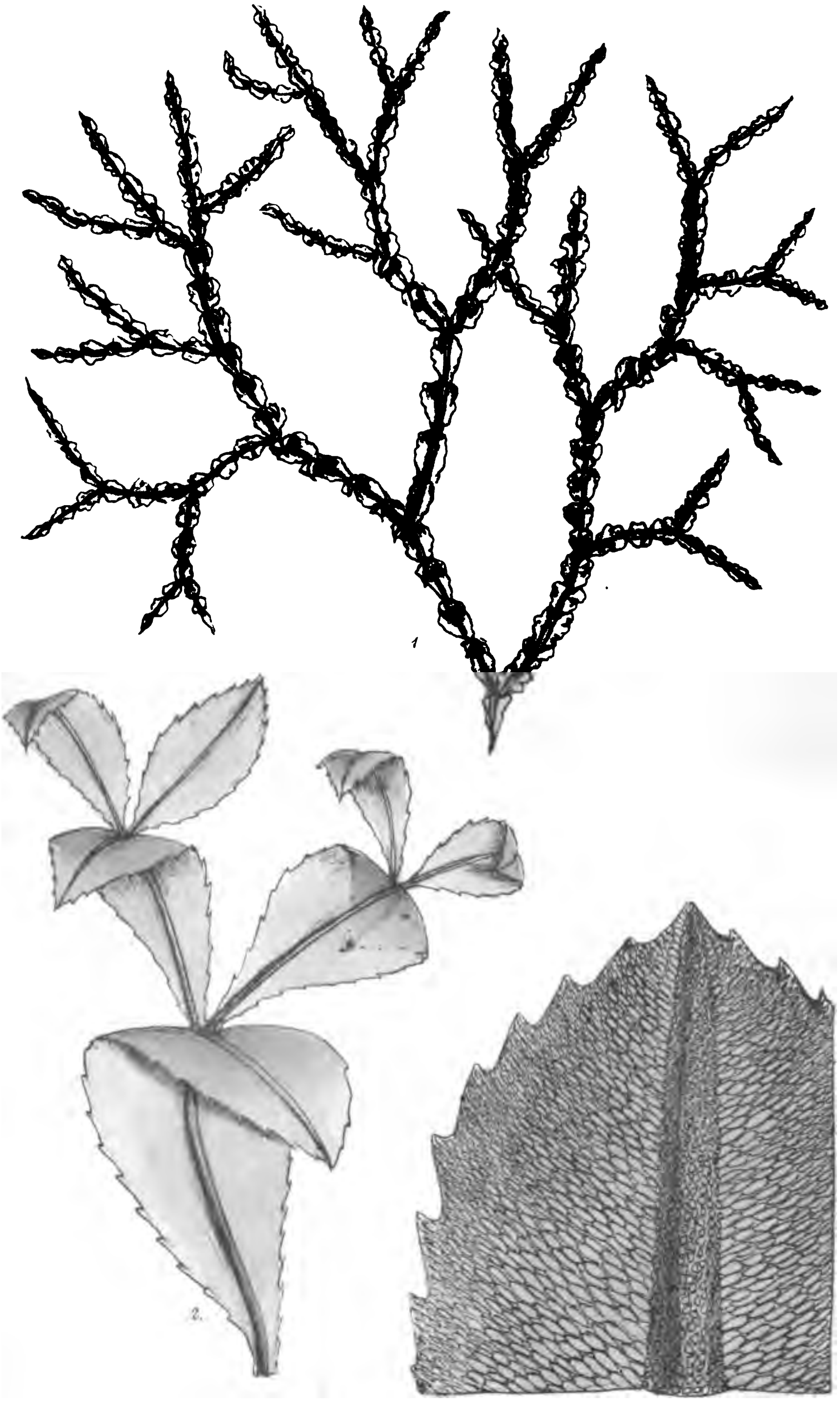
GEOGR. DISTR. Western Australia.

DESCR. *Root? Stem* 3–5 feet long, 2–3 lines wide, strongly compressed, or flattened, slightly flexuous from node to node, alternately branched; the branches similarly compressed, and several times compounded in an alternately pinnate manner. The *branches* are about an inch apart, and are 6–12 inches long or more, issuing from the flattened sides of the stem, and strongly retrofracted at their insertion. All the minor divisions issue in like manner, and are similarly retrofracted. The primary pinnules of the pinnated branches are 2–3 lines apart, strongly compressed, their edges (in the vertical plane) setaceous, their flat sides (horizontal) ½ line wide: their lesser divisions are subdichotomous, with very wide axils, 1–2 lines apart. The lower portion of each *pinna*, or primary branch, is generally denuded, and alternately armed with the rigid, deflexed bases of old pinnules, set one above the other like steps on a ladder. *Vesicles* very few, often absent, and rarely more than one on the same branch, 2–2½ lines in diameter, pointless, between spherical and ovoid. *Receptacles* very minute, 1–2 lines long, torulose, with 2–3 joints. *Colour* a very dark brown. *Substance* coriaceous when fresh, rather brittle when dry.

This, which is one of the handsomest species of *Cystophora*, appears to be confined to the western and south-western coasts of the continent. The only specimens gathered by me were found cast ashore on the narrow neck of land that forms the south-eastern enclosure of Princess Royal Harbour, King George's Sound; nor has Dr. Mueller sent it in any of his earlier collections, made to the westward of Cape Northumberland. It may readily be known from all others by the minutely divided, slender ramuli, and the very small receptacles. The vesicles are very frequently absent, and often not more than one or two occur on a large fragment of frond.

Fig. 1. CYSTOPHORA BROWNII; part of a frond,—*the natural size.* 2. Fertile apex of a pinnule, with receptacles. 3. Section through a receptacle. 4. A spore. 5. Antheridia:—*all magnified.*

Plate CLII.



Vincent Brooks, Imp.

Ser. RHODOSPERMEÆ. Fam. *Sphærococcoideæ.*

PLATE CLXX.

DELESSERIA REVOLUTA, *Harv.*

GEN. CHAR. *Frond* leaf-like, membranous, areolated, symmetrical, simple or branched, midribbed. *Fructification:* 1, hemispherical *conceptacles*, sessile on the midrib or on a lateral nerve, containing a tuft of moniliform spore-threads on a basal placenta; 2, tripartite *tetraspores*, in definite sori or spots, on the frond or on accessory leaflets.—DELESSERIA (*Ag.*), in honour of Baron Delessert, a distinguished patron of botany.

Frons foliacea, membranacea, areolata, symmetrica, simplex v. ramosa, costata. Fruct.: 1, *coccidia in costâ venisque frondis sessilia, hemisphærica, fila sporifera moniliformia a placenta basali emissa foventia;* 2, *tetrasporæ triangule divisæ, in soros definitos collectæ.*

DELESSERIA *revoluta;* frond dichotomous, formed of a string of small, strongly ribbed, epiphyllous leaflets, with revolute apices; leaflets ovato-lanceolate, serrate, wavy, delicately membranous, pale-red, once and a half to twice as long as their breadth; sori unknown.

D. revoluta; *fronde dichotoma e foliolis parvis costatis seriatim epiphyllis apice revolutis formata; foliolis ovato-lanceolatis serratis undulatis tenui-membranaceis latitudine sesqui- v. subduplo-longioribus; soris ?*

DELESSERIA revoluta, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 548; *Alg. Austr. Exsic. n.* 279.

HAB. Parasitical on Algæ. King George's Sound, and Rottnest Island, *W. H. H.* Fremantle, *G. Clifton.*

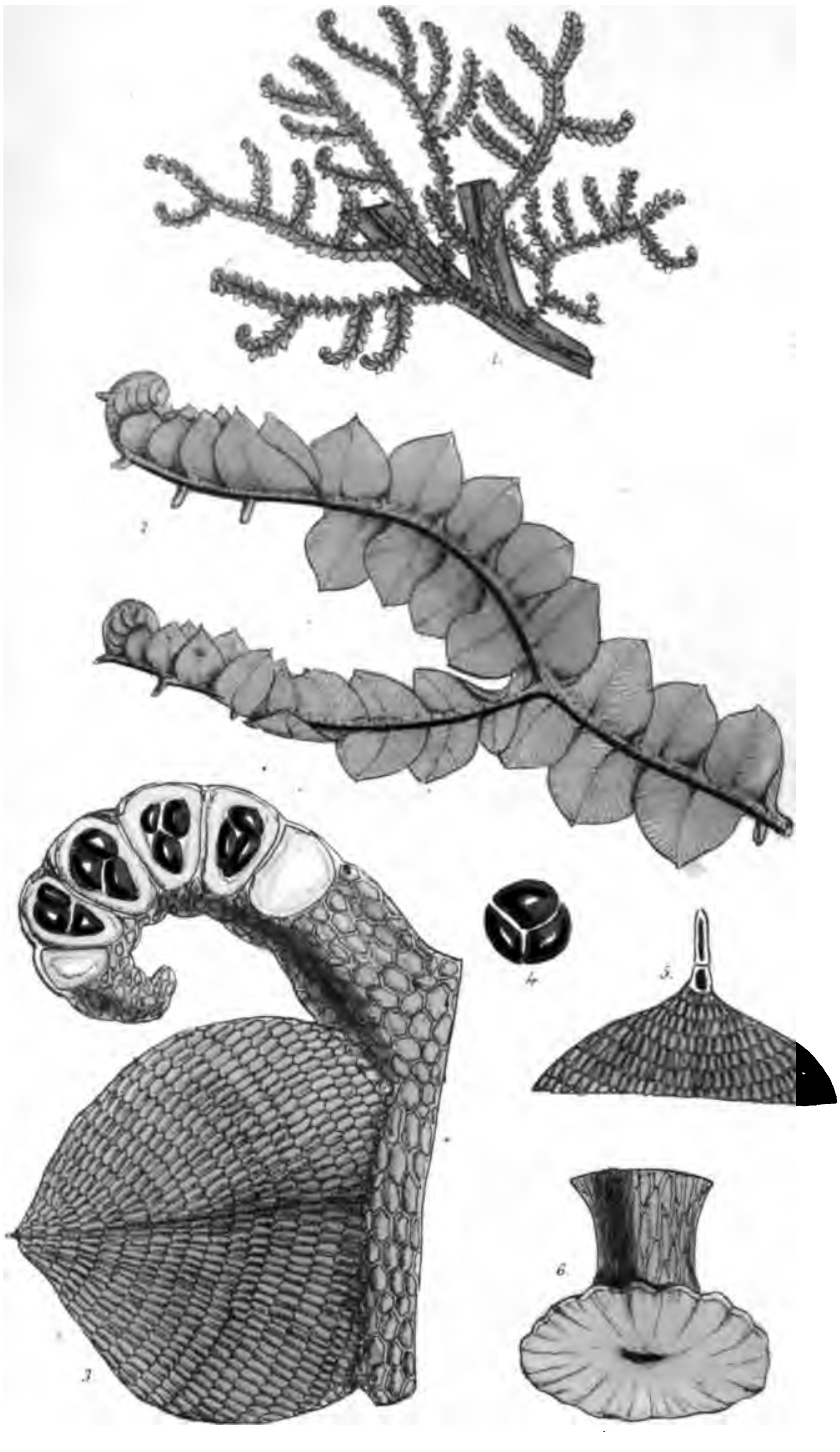
GEOGR. DISTR. West and south-west coasts of Australia.

DESCR. *Root* a minute disc. Full-grown *frond* 4–5 inches long, dichotomously branched, with a strong midrib, 2–2½ lines wide, divided into short, joint-like internodes, something after the manner of an epiphyllous *Cactus.* This frond is formed by a series of small leaflets, growing one from another, each from ¼ to ⅓ inch long, strongly ribbed, sharply serrated, and revolute at the point. The new leaflet successively springs from the midrib of the previous one, on the dorsal surface, at about ⅓ of the length of the leaflet below its apex; sometimes one, sometimes two spring from the same point. The structure is delicate and thin, but the cells of which it is composed are small, ranged in lines obliquely from the midrib to the margin. The fruit has not yet been observed. The *colour* is a pale rose-red, soon discharged in fresh-water. The *substance* is soft and membranous, and in drying the frond adheres closely to paper.

No fructification has yet been noticed on this plant, and consequently its genus may be considered uncertain; but the structure of the membrane, as well as the epiphyllous development, point to that section of the genus *Delesseria* of which *D. hypoglossum* is the type. *D. revoluta* is chiefly remarkable for the extreme shortness, in proportion to breadth of the leaflets of which the branches are composed, and for the remarkable recurvature of the points of all the leaflets above the insertion of each epiphyllum. To a casual examiner the branch looks as if composed of successive constrictions merely, not of separate leaflets.

It is seemingly an annual species, and not very uncommon, though hitherto only noticed in Western Australia.

Fig. 1. DELESSERIA REVOLUTA,—*the natural size*. 2. Some of the epiphyllous leaflets, forming the extremities of the frond. 3. Apex of a leaflet:—both *magnified*.



Vincent Brooks Imp

PLATE CLXXI.

LEVEILLEA SCHIMPERI, *Dcne.*

GEN. CHAR. *Stem* filiform, areolated, branched; branches distichously pinnate, circinate at the apex. *Pinnæ* alternate, leaf-like, very entire, transversely zoned, with hexagonal cells. *Fructification:* 1, *ceramidia* . . .; 2, hooked or circinately involute, sessile, supra-axillary *stichidia*, containing large, triangularly-parted tetraspores, in a single row.—LEVEILLEA (*Dcne.*), in honour of H. J. Léveillé, a distinguished French cryptogamic botanist, and writer on Fungi.

Caulis filiformis, areolatus, ramosus, ramis distiche pinnatis apice circinatim involutis. Pinnæ alternæ, foliaceæ, integerrimæ, transversim zonatæ, cellulis hexagonis. Fruct.: 1, *ceramidia* . . .; 2, *stichidia supra-axillaria, sessilia, hamata, v. circinata, tetrasporas magnas triangule partitas singula serie evolutas foventia.*

LEVEILLEA *Schimperi;* pinnæ broadly ovate, subimbricate, acute or mucronulate (sometimes penicillate at the apex), very entire.

L. Schimperi; *pinnis latissime ovatis subimbricatis acutis v. mucronulatis nonnunquam apice penicillatis, integerrimis.*

LEVEILLEA Schimperi, *Dcne. Ann. Sc. Nat.* 1839, *p.* 375. *Dcne. in Archiv Mus. v.* 2. *p.* 161. *t.* 6. *f. A. Endl. 3rd Suppl. p.* 48. *Kütz. Sp. Alg. p.* 882.

AMANSIA jungermannioides, *Mert. et Her. in Flora*, 1836, *p.* 485, *cum icone.*

POLYZONIA jungermannioides, *J. Ag. Linn. v.* 15. *p.* 25.

HAB. Parasitical on *Fucoideæ.* Common at Fremantle, Western Australia, *W. H. H., G. Clifton.*

GEOGR. DISTR. Western Australia. Red Sea. Ceylon and Singapore?

DESCR. *Frond* originating in a prostrate filament (*surculus*), creeping by means of small discs emitted at intervals along its lower surface. The apex of this filament is prolonged into a free *stem* or primary frond, which is sparingly branched, and everywhere distichously pinnated with leaf-like pinnæ from ¼ to ½, or nearly 1 line in length and breadth. Pinnæ broadly ovate or subrotund, or occasionally oblong, slightly overlapping at the edges, rather obliquely inserted on the branch, when young tipped with one or two excurrent cells, which sometimes are prolonged into penicillate filaments; they are traversed by a medial line or incipient midrib, and areolated with oblong, hexagonal cells. The young ends of the branches, with the undeveloped pinnæ, are spirally inrolled. *Stichidia* issuing from the upper edge of the pinnæ, above the axil, sessile, strongly hooked or spirally inrolled, containing four or five large tetraspores in a single row. *Ceramidia* unknown to me. *Colour* a dull dark-purple. *Substance* soft and membranous. In drying the frond closely adheres to paper.

A very beautiful little plant, with a habit completely resembling that of a *Jungermannia* of the section *Plagiochila.* Decaisne describes two other West Australian species, which either I have not seen, or have confounded with what is here figured, and which I regard as identical with Schimper's specimens from the Red Sea. In W. Australia, where *L. Schimperi* is very common on several of the *Sargassa,* it varies considerably in size and in degree of ramification, and less so in the order of branching and shape of the leaflets or pinnæ. Still, only one species seems present. Nor can I well distinguish Decaisne's *L. gracilis* of Ceylon, where I have gathered specimens in equal plenty, from some of the more slender specimens of Western Australia. On the whole I am inclined to unite the *L. gracilis, L. pectinata,* and *L. comosa* of Dcne., to the *L. Schimperi,* of which they may be varying forms, or imperfectly developed fronds. *L. ciliata,* by its ciliated pinnæ, is perhaps more distinguishable.

The genus *Leveillea* is nearly related to *Polyzonia,* but sufficiently different in habit and character.

Fig. 1. LEVEILLEA SCHIMPERI,—*the natural size.* 2. Part of the frond,—*enlarged.* 3. A leaf-like pinna and supra-axillary stichidium. 4. A tetraspore. 5. Apex of a young pinnule. 6. One of the discs or holdfasts of the creeping stem :—*magnified.*

Ser. CHLOROSPERMEÆ. Fam. *Siphonaceæ.*

PLATE CLXXII.

CAULERPA PARVIFOLIA, *Harv.*

GEN. CHAR. *Frond* consisting of prostrate surculi, rooting from their lower surface, and throwing up erect branches (or secondary fronds) of various shapes. *Substance* horny-membranous, destitute of calcareous matter. *Structure* unicellular, the cell continuous, strengthened internally by a spongy network of anastomosing filaments, and filled with semifluid, grumous matter. *Fructification* unknown.—CAULERPA (*Lamx.*), from καυλος, *a stem,* and ἑρπω, *to creep.*

Frons ex surculis prostratis hic illic radicantibus et ramis erectis polymorphis formata. Substantia corneo-membranacea. Structura unicellulosa, cellulæ membrana continua hyalina intus filis cartilagineis tenuissimis anastomosantibus firmata et endochromate denso viridi repleta. Fr. ignota.

CAULERPA *parvifolia;* surculus setaceous, glabrous; fronds erect, simple or forked, linear-strapshaped, very entire, obtuse or emarginate, tapering at base into a very short stipes, obsoletely costate.

C. parvifolia; *surculo setaceo glabro; frondibus erectis simplicibus furcatisve brevissime stipitatis lineari-ligulatis integerrimis obtusis v. subemarginatis obsoletissime costatis.*

CAULERPA parvifolia, *Harv. Alg. Austr. Exsic. n.* 548.

HAB. Kiama, New South Wales, in crevices of tidal rocks, *W. H. H.*

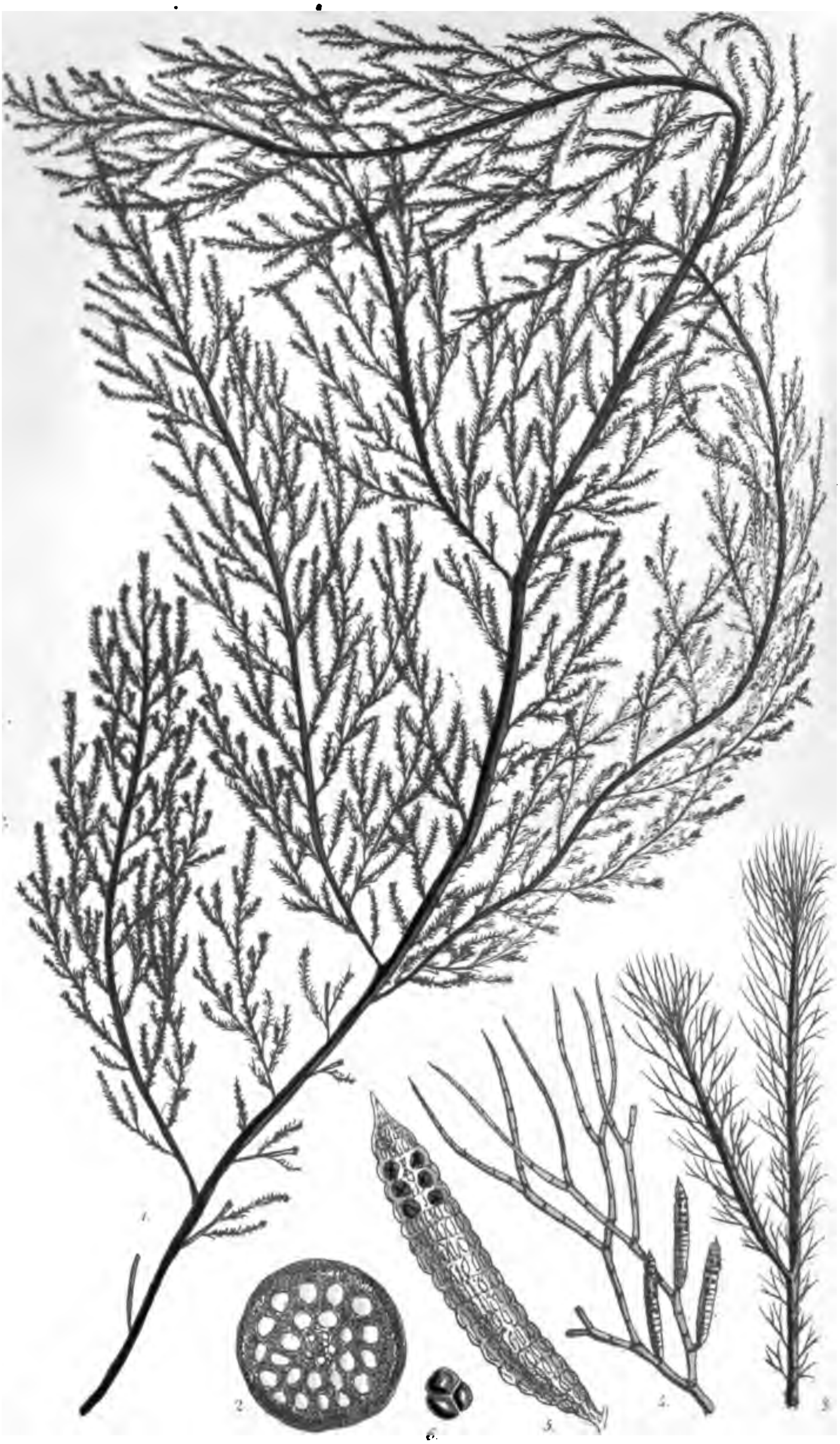
GEOGR. DISTR. East coast of Australia.

DESCR. *Surculus* 2–4 inches long, scarcely as thick as hog's-bristle, glabrous, emitting a few slender, slightly branched rootlets. *Fronds* one or two inches long, 1–1½ line wide, quite flat, glabrous, perfectly entire, linear, blunt, raised on a minute stipes, which is rarely more than one or two lines long, either quite simple or once forked, occasionally proliferous from the summit. A faint medial line, simulating a nerve, is more or less visible, especially in the dried specimens. The *colour* is a dark sap-green, with a yellowish tinge towards the extremities. The *substance* is membranous and glossy, and tolerably soft, and in drying the frond adheres to paper.

One of the smallest species of the extensive genus *Caulerpa,* allied on the one hand to *C. prolifera,* and on the other to *C. anceps,* an unpublished species, from the Friendly Islands. The membrane in *C. parvifolia* is much thinner and more delicate than in either of these; the fronds are more linear and very much smaller than in *C. prolifera*, and they are much less divided than in *C. anceps*. *C. brachypus*, from Japan, has broader, shorter, and thicker, nearly sessile fronds, and a much stouter surculus, with longer roots, etc.

Fig. 1. CAULERPA PARVIFOLIA,—*the natural size*. 2. A frond,—*magnified*.

Plate CIII



Vincent Brooks Imp.

PLATE CLXXIII.

DASYA FEREDAYÆ, *Harv.*

GEN. CHAR. *Frond* filiform or compressed, dendroid; stem and branches coated with small, polygonal cells (rarely articulated, and many-tubed); the axis articulate, composed of several radiating cells surrounding a central cavity; ramelli articulated, one-tubed. *Fructification:* 1, ovate or urceolate *ceramidia;* 2, lanceolate *stichidia,* attached to the ramelli, and containing triangularly-parted tetraspores in transverse rows.—DASYA (*Ag.*), from δασυς, *hairy.*

Frons filiformis v. compressa, dendroidea. Caulis ramique majores strato cellularum corticati (raro pellucide articulati), ramellis monosiphoniis obsessi; axis articulatus, ex cellulis pluribus radiantibus tubum centralem cingentibus formatus. Fruct.: 1, *ceramidia ovata v. urceolata;* 2, *stichidia lanceolata, ex ramellis enata, tetrasporas transversim ordinatas foventia.*

DASYA *Feredayæ;* stem very long, glabrous, opaque, cartilaginous, decompoundly much branched; lateral branches virgate, slender, directed towards all sides, repeatedly divided alternately; smaller branches either virgate or divided, attenuated, ramelliferous; ramelli rosy, monosiphonous, patent or squarrose, crowded at the apices, dichotomo-multifid, with patent axils and attenuated apices; articulations of the ramelli 4–6 times as long as broad; stichidia linear, suddenly acuminate; ceramidia unknown.

D. Feredayæ; *caule elato glabro opaco cartilagineo decomposite ramosissimo; ramis lateralibus virgatis gracilibus quaquaversis iterum et iterum alterne divisis, minoribus nunc virgatis simplicibus nunc ramosis attenuatis ramelliferis; ramellis roseis monosiphoniis undique insertis patentibus v. squarrosis ad apices densioribus dichotomo-multifidis axillis patentibus apice attenuatis, articulis ramellorum diametro 4–6-plo longioribus; stichidiis linearibus apice cuspidatis; ceramidiis?*

DASYA Feredayæ, *Harv. Alg. Austr. Exsic. n.* 220. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 303.

HAB. Georgetown, Tasmania, *Mrs. Fereday, W. H. H., Gunn, etc.*

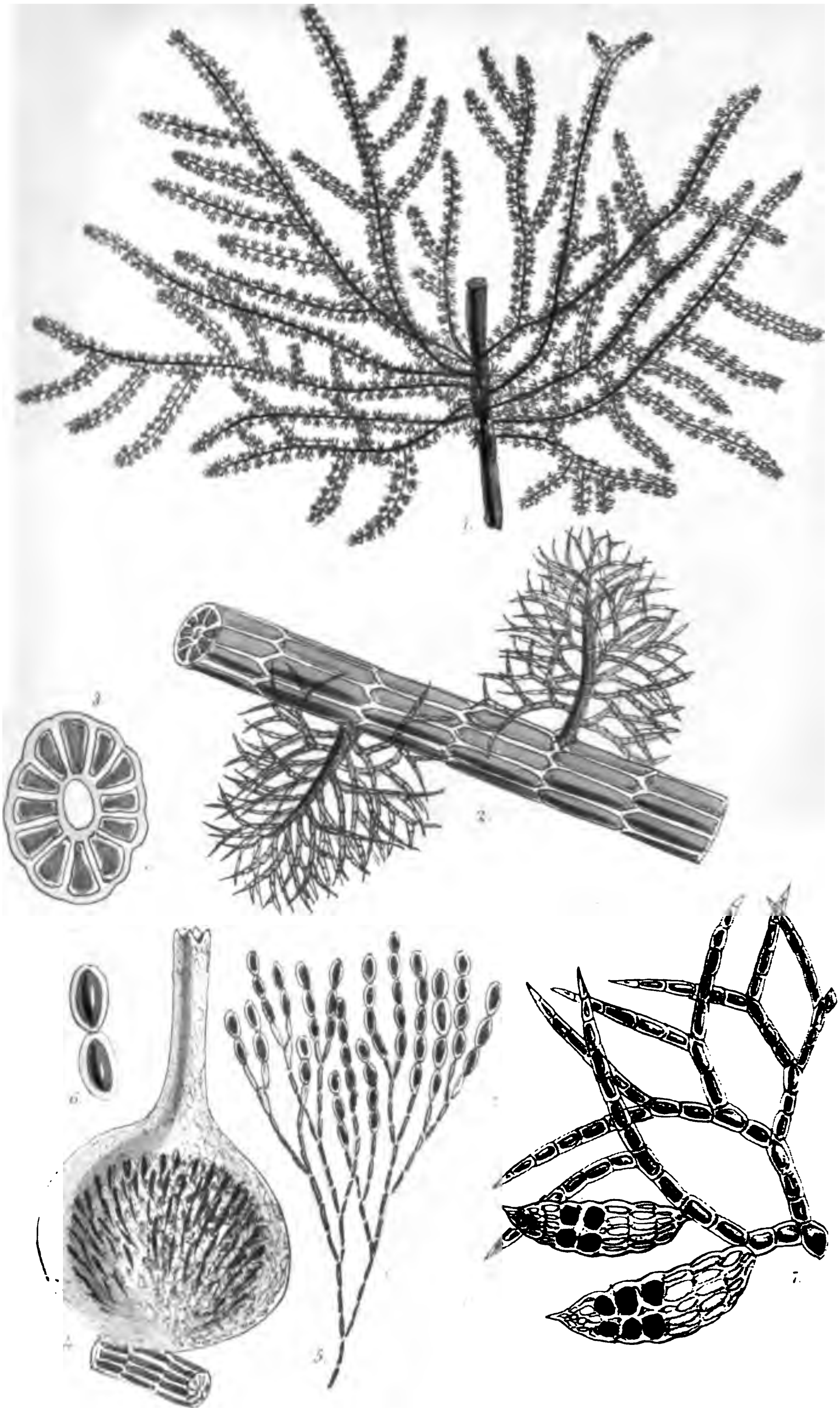
GEOGR. DISTR. Tasmania.

DESCR. *Root* a small disc. *Stem* one, two, or more feet long, a line in diameter below, attenuated upwards, simple or forked or decompound, glabrous and quite opaque, set throughout with lateral branches. Lateral (primary) *branches* 10–12 inches long, opaque like the stem, tapering to the base, and very slender at their insertion, attenuated to the point, repeatedly divided alternately. Ultimate *branchlets* scattered, not pinnately arranged, ½–1½ inch long, setaceous, ramelliferous. *Ramelli* inserted on all sides, 1–1½ lines long, rosy, patent or squarrose, dichotomous, taper-pointed, their articulations 4–6 times longer than broad, cylindrical. *Stichidia* linear, acuminate, many times longer than broad, borne by the ramelli. *Ceramidia* unknown. *Colour* of the stem and branches a dull red or red-brown; of the ramelli rosy. *Substance* rather firm, not soon decomposing in fresh-water, and not in the least gelatinous. In drying the frond adheres firmly to paper.

This species is named in compliment to Mrs. Fereday, of Georgetown, in whose collection I first saw some fine specimens. Subsequently I collected it in considerable plenty in the Tamar, above Georgetown, where it is occasionally drifted ashore in large quantity.

It is most allied, perhaps, to *D. villosa*, some forms of which it somewhat resembles, but is of much firmer and less gelatinous texture, bears exposure to fresh-water for a much longer period; has shorter and less attenuated ramelli, and is more decompoundly branched.

Fig. 1. DASYA FEREDAYÆ,—*the natural size.* 2. Section of the stem. 3. Ramulus. 4. Ramellus, with stichidia. 5. A stichidium. 6. A tetraspore: —variously *magnified.*



Vincent Brooks Im.

PLATE CLXXIV.

DASYA WRANGELIOIDES, *Harv.*

GEN. CHAR. *Frond* filiform or compressed, dendroid; stem and branches coated with small, polygonal cells (rarely articulated, and many-tubed); the axis articulate, composed of several radiating cells surrounding a central cavity; ramelli articulated, one-tubed. *Fructification:* 1, ovate or urceolate *ceramidia*; 2, lanceolate *stichidia*, attached to the ramelli, and containing triangularly-parted tetraspores in transverse rows.—DASYA (*Ag.*), from δασυς, *hairy.*

Frons filiformis v. compressa, dendroidea. Caulis ramique majores strato cellularum corticati (raro pellucide articulati), ramellis monosiphoniis obsessi; axis articulatus, ex cellulis pluribus radiantibus tubum centralem cingentibus formatus. Fruct.: 1, *ceramidia ovata v. urceolata;* 2, *stichidia lanceolata, ex ramellis enata, tetrasporas transversim ordinatas foventia.*

DASYA *Wrangelioides;* stem slender (2–4-uncial), pellucidly articulate, 10–12-tubed, distichously branched, closely set throughout with minute, distichous, ramelliferous ramuli; branches few, patent, incurved, subsimple; ramelli repeatedly dichotomous, acute, their articulations once and a half as long as broad; ceramidia globoso-urceolate, with a very long neck; stichidia very minute, oblong-lanceolate, acute.

D. Wrangelioides; *cauli gracili* (2–4-*unciali*) *pellucide articulato* 10–12-*siphonio distiche ramoso ramulis perbrevibus ramelliferis distichis obsesso; ramis paucis patentibus incurvis simpliciusculis; ramellis multoties divaricato-dichotomis acutis eorum articulis diametro sesquilongioribus; ceramidiis globoso-urceolatis, ore longissimo cylindraceo; stichidiis minutissimis oblongo-lanceolatis acutis.*

DASYA Wrangelioides, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 542; *Alg. Austr. Exsic. n.* 207.

HAB. Fremantle, King George's Sound and Cape Riche, *W. H. H.* Fremantle, *G. Clifton.* Western Port, Victoria, *W. H. H.*

GEOGR. DISTR. West and south coasts of Australia.

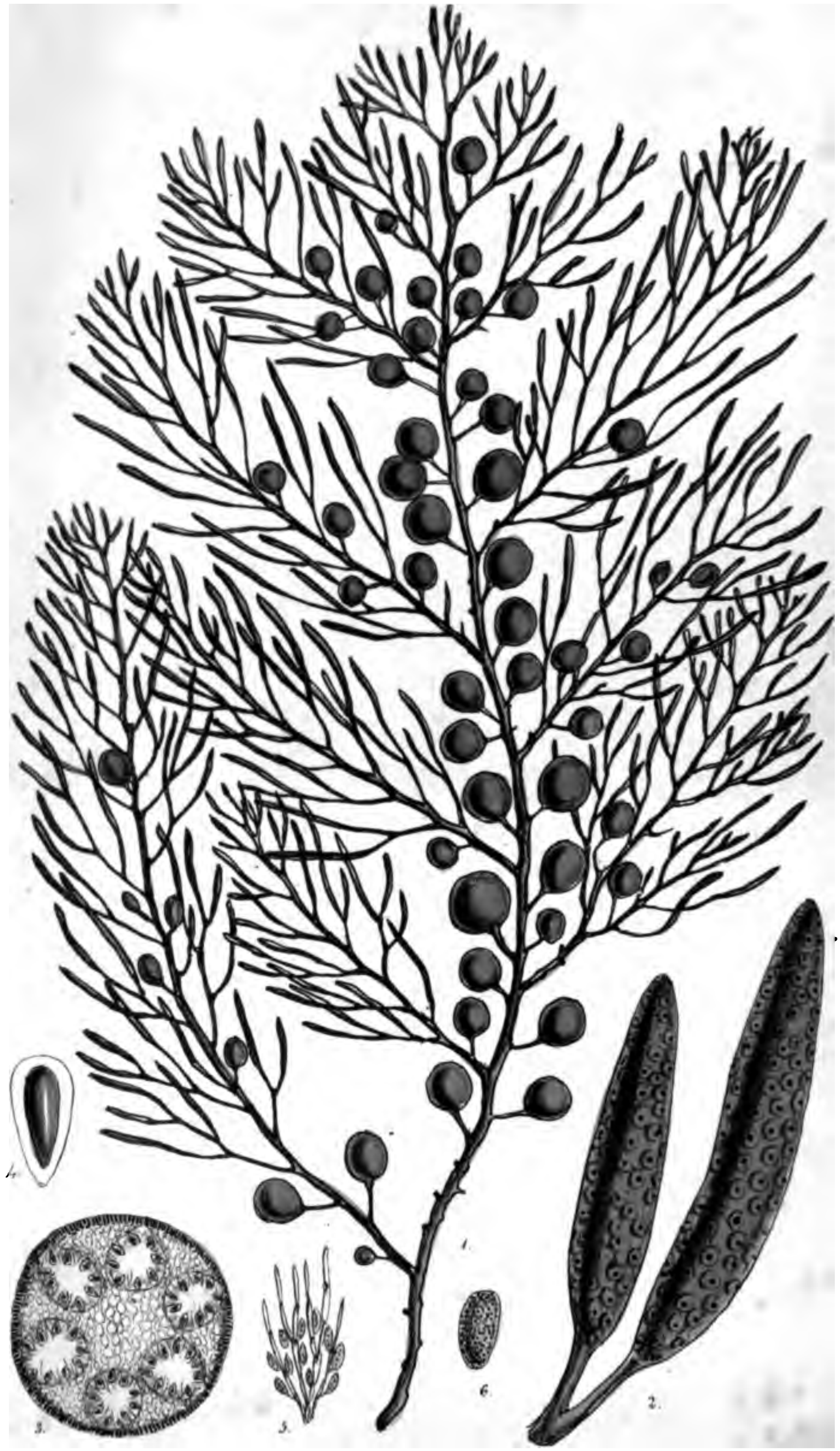
DESCR. *Stems* numerous, tufted, rising from decumbent, creeping filaments, 2–4 inches long, setaceous, furnished with a few, irregularly alternate or secund, simple, patent, incurved branches; all parts of the stem and branches pellucidly articulated. *Stem* and *branches* set throughout, at distances of half a line or less, with distichous, very minute, ramelliferous ramuli. *Ramuli* not a line long, clothed with multifid, squarrose, monosiphonous ramelli of about their own length. *Ceramidia* borne by the ramuli, globose, with a long, protruding, cylindrical neck and crenulate aperture, areolated, containing a dense tuft of much-branched, dichotomous sporethreads, whose terminal ramifications are formed into strings of oblong or oval spores. *Stichidia* very minute, on the ramelli, varying from ovate-acute to oblong-lanceolate, seldom containing more than 2–4 tetraspores. *Colour* a deep crimson-red, either preserved in drying or changing to dull red-brown. *Substance* membranous, not gelatinous. In drying the frond adheres, but not very firmly, to paper.

A well-marked species, whose specific name alludes to an external resemblance borne to *Wrangelia velutina*, a plant widely differing in fructification and microscopic structure.

The structure of the nuclear contents is different from what is usual in *Dasya*, where we generally find simple or subsimple sporethreads bearing terminal pyriform spores. Much-branched sporethreads indeed occur in *D. Muelleri* and some others; but in those cases the spores are solitary on each branch, and pyriform. A nearer structure to that of the present species is met with in *D. Haffiæ*; but still the agreement is not perfect: nor have I noticed truly moniliform strings of spores in any other species.

Fig. 1. DASYA WRANGELIOIDES,—*the natural size*. 2. Fragment of a branch, with ramuli. 3. Cross section of a branch. 4. A ceramidium. 5. A sporethread from the same. 6. Seriated spores. 7. A ramellus, bearing *stichidia*:—variously *magnified*.

Plate CLXXV



Vincent Brooks Imp.

Plate CLXXV.

CYSTOPHORA UVIFERA, *J. Ag.*

Gen. Char. *Root* scutate. *Frond* pinnately decompound, dendroid, with a distinct stem, branches, and ramuliform leaves. *Vesicles* stipitate, simple, rarely absent. *Receptacles* pod-like, torulose or moniliform, developed in the ramuli. *Scaphidia* hermaphrodite. *Spores* obovoid, —Cystophora (*J. Ag.*), from κυστις, *a bladder*, and φορεω, *to bear.*

Radix scutata. Frons pinnatim decomposita, dendroidea, caule proprio, ramis foliisque ramuliformibus donata. Vesiculæ stipitatæ, simplices, raro nullæ. Receptacula siliquæformia, torulosa v. nodulosa, apice ramulorum evoluta. Scaphidia hermaphrodita.

Cystophora *uvifera;* stem terete, undivided; branches issuing from all sides, pinnately ramulose; ramuli filiform, simple or forked, the ultimate changing into cylindrical receptacles; vesicles spherical, pointless, issuing from the stem, and occasionally from the larger branches.

C. uvifera; *caule tereti indiviso; ramis undique egredientibus pinnatim ramulosis; ramulis filiformibus simplicibus v. furcatis, ultimis in receptacula cylindracea abeuntibus; vesiculis sphæricis muticis e caule vel raro ramis majoribus egredientibus.*

Cystophora uvifera, *J. Ag. Sp. Alg. v.* 1. *p.* 246. *Harv. Alg. Austr. Exsic. n.* 13. *Harv. in Hook. Fl. Tasm. v.* 2. *p.* 284.

Blossevillea uvifera, *Harv. in Hook. Lond. Journ. v.* 6. *p.* 414. *Kütz. Sp. Alg. p.* 630.

Sargassum uviferum, *Ag. Syst. p.* 306. *Sond. Pl. Preiss. v.* 2. *p.* 165.

Hab. Western Australia, *Preiss.* Coast of Victoria, *Dr. Mueller, W. H. H., etc.* Tasmania, *Gunn, W. H. H., etc.*

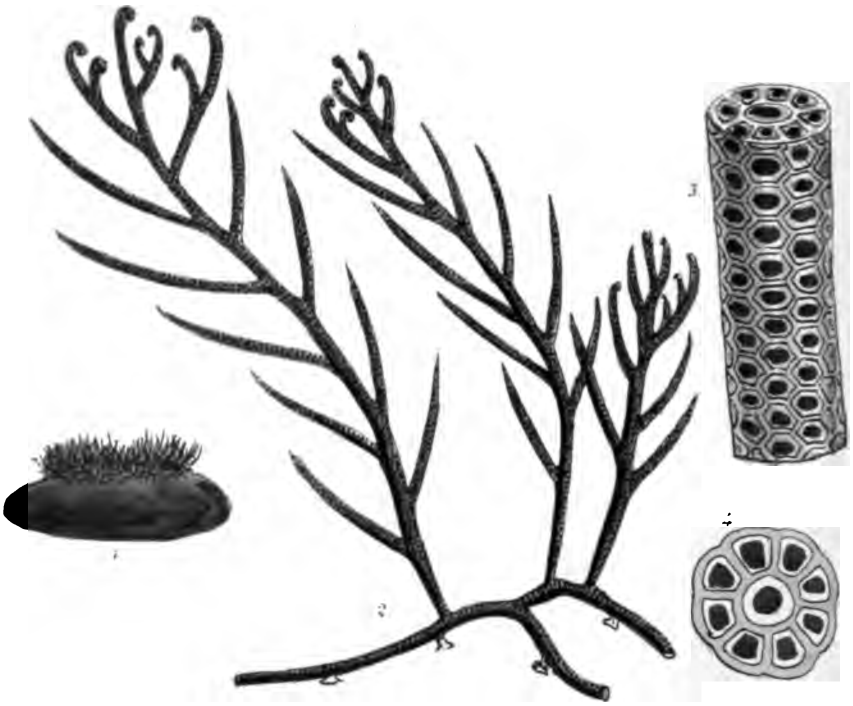
Geogr. Distr. West and south coasts of New Holland. Tasmania.

Descr. *Root* branching. *Stem* 1–3 feet high, half a line to a line in diameter, cylindrical, quite simple, naked and rough with the remains of broken branches for 4–6 inches above the base, thence upward closely set throughout with alternate lateral branches; the whole frond having an ovate-oblong outline. The *branches* issue from all sides of the stem; usually they are 3–5 inches long, and destitute of vesicles, somewhat pinnated throughout with subsimple or slightly compound ramuli; occasionally they are 12–14 inches long, in which case they bear vesicles like the stem, and are more decompound than ordinary branches. *Vesicles* globose, 2–4 lines in diameter, without point, on short cylindrical petioles rising from the stem (rarely also from the branches), generally abundant. *Receptacles* formed from the terminal ramuli, cylindrical, ½–1 inch long. *Colour* a dark-olive. *Substance* coriaceous, flexible.

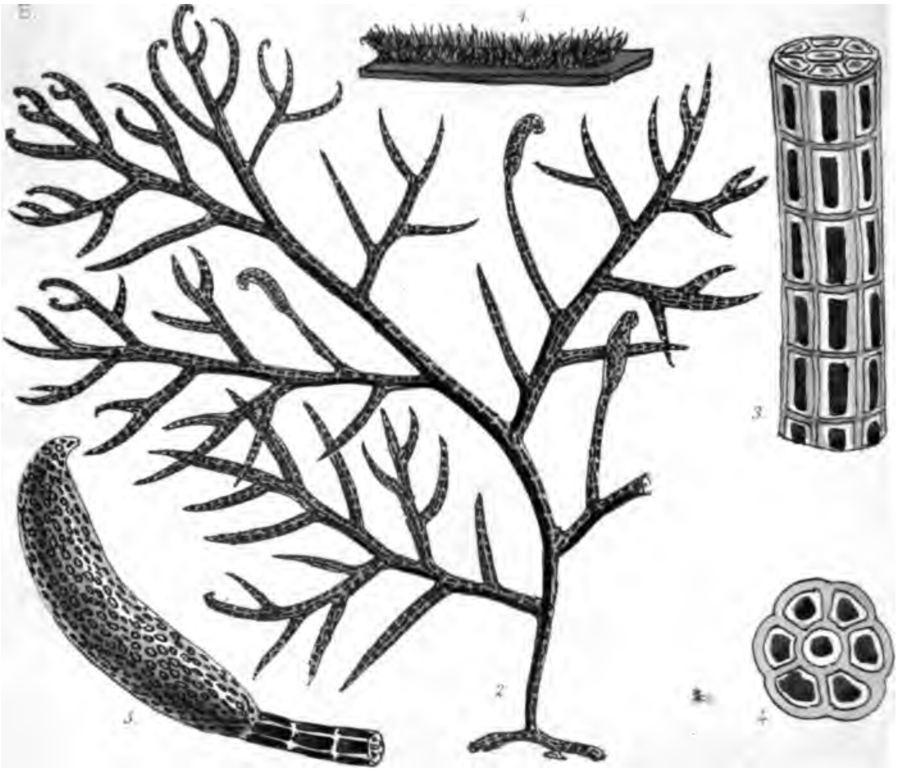
A common species on the southern coast, and in Tasmania, most allied to *Cyst. botryocystis* (Plate LVI.), which is a much more branching plant, and to *Cyst. cephalornithos* (Plate CXVI.), which is always known by its differently shaped and pointed air-vessels.

Fig. 1. CYSTOPHORA UVIFERA,—*the natural size*. 2. Receptacles. 3. Cross-section of a receptacle. 4. A spore. 5. Tuft of antheridia. 6. An antheridium:—variously *magnified*.

A



B



Vincent Brooks, Imp.

PLATE CLXXVI. (A).

BOSTRYCHIA MIXTA, *Hook. f. and Harv.*

GEN. CHAR. *Frond* filiform, pinnately branched, inarticulate (or subarticulate with very short internodes), tessellated with quadrate or hexagonal cells; *axis* tubular, articulated, surrounded by one or more concentric rows of coloured cells. *Ramuli* hook-pointed. *Fructification:* 1, ovate, terminal *ceramidia,* containing a tuft of pear-shaped spores; 2, fusiform, terminal *stichidia,* containing a double row of tetraspores.—BOSTRYCHIA (*Mont.*), from *βοστρυχος, a ringlet* or *curl of hair.*

Frons filiformis, pinnatim ramosa, inarticulata (v. vix articulata articulis brevissimis) cellulis hexagonis v. quadratis corticata. Axis tubulosus, articulatus, monosiphonius, cellulis uni-pluriseriatis endochromaticis superficiem versus brevioribus circumdatus. Ramuli sæpissime involuti v. uncinati. Fruct.: 1, *ceramidia ovata, terminalia, fasciculum sporarum pyriformium continentia;* 2, *stichidia terminalia, fusiformia, tetrasporas biseriatas foventia.*

BOSTRYCHIA *mixta;* stems pinnate; pinnæ patent, simple or forked or alternately ramulous; ramuli subulate, divaricate; apices straight, the younger subinvolute; axils wide; cortical cells hexagonal, wider than long; stichidia curved.

B. mixta; *caulibus pinnatis; pinnis patentibus simplicibus v. furcatis v. alterne ramulosis; ramulis subulatis divaricatis; apicibus strictis v. junioribus involutis; axillis latis; cellulis corticalibus hexagonis oblatis; stichidiis curvatis.*

BOSTRYCHIA mixta, *Hook. fil. and Harv. in Lond. Jour. Bot. v.* 4. *p.* 270 *and p.* 539. *Harv. Ner. Austr. p.* 70. *Kütz. Sp. Alg. p.* 840. *Harv. in Hook. Fl. N. Zeal. v.* 2. *p.* 225. *Harv. Alg. Austr. Exsic. n.* 148. *Fl. Tasm. v.* 2. *p.* 298.

HAB. Port Arthur, Tasmania, on stones between tidemarks, *W. H. H.*

GEOGR. DISTR. Tasmania. New Zealand. Cape of Good Hope.

DESCR. *Fronds* half an inch long, densely tufted, or spreading in wide patches, rising from creeping filaments. *Stems* simple, erect; simply pinnate, or subbipinnate toward the apex; the lower pinnæ subulate, erecto-patent, with straight, acute apices, the upper slightly compound, with the apices hooked or inrolled. *Cells* about 8 in a single row, their external (superficial) faces hexagonal, wider than their length. *Fruit* not seen on Australian specimens. *Colour* a very dull dark-purple. *Substance* somewhat rigid. It imperfectly adheres to paper in drying.

The genus *Bostrychia,* of which a great many species are now known, in various parts of the world, has but few representatives in Australia, and these are of the humble sort. It is remarkable, among *Rhodospermeæ,* for occupying either littoral rocks at the extreme edge of high-water, or the estuaries of of rivers. Some species occur even in fresh-water streams, at a considerable distance away from the sea; while one is quite terrestrial, subject merely to the occasional dash of sea-spray.

Fig. 1. BOSTRYCHIA MIXTA, on stone,—*the natural size.* Fig. 2. Fronds of the same. 3. Part of a branch, cross section :—*magnified.*

PLATE CLXXVI. (B.)

BOSTRYCHIA RIVULARIS, *Harv.*

BOSTRYCHIA *rivularis;* stems (subuncial) capillary, bipinnate; pinnæ distichous, alternate, patent, tessellated with subquadrate cells; pinnules subdistant, simple or sparingly ramulous, attenuate, marked with 2–3 rows of oblong cells; conceptacles ovate; stichidia incurved.

B. rivularis; *caulibus (subuncialibus) capillaribus bipinnatis, pinnis distichis alternis patentibus cellulis quadratis tessellatis; pinnulis subdistantibus simplicibus v. ramuligeris attenuatis cellulis oblongis 2–3-serialibus notatis, conceptaculis ovatis, stichidiis incurvis.*

BOSTRYCHIA rivularis, *Harv. Ner. Bor. Amer. v.* 2. *p.* 57. *t.* 14 *D.; Alg. Austr. Exsic. n.* 147.

HAB. On sticks, roots, and grass, etc., near the estuaries of tidal rivers, or in brackish water near the sea. In the river Moy, Port Fairy, Victoria, *W. H. H.*

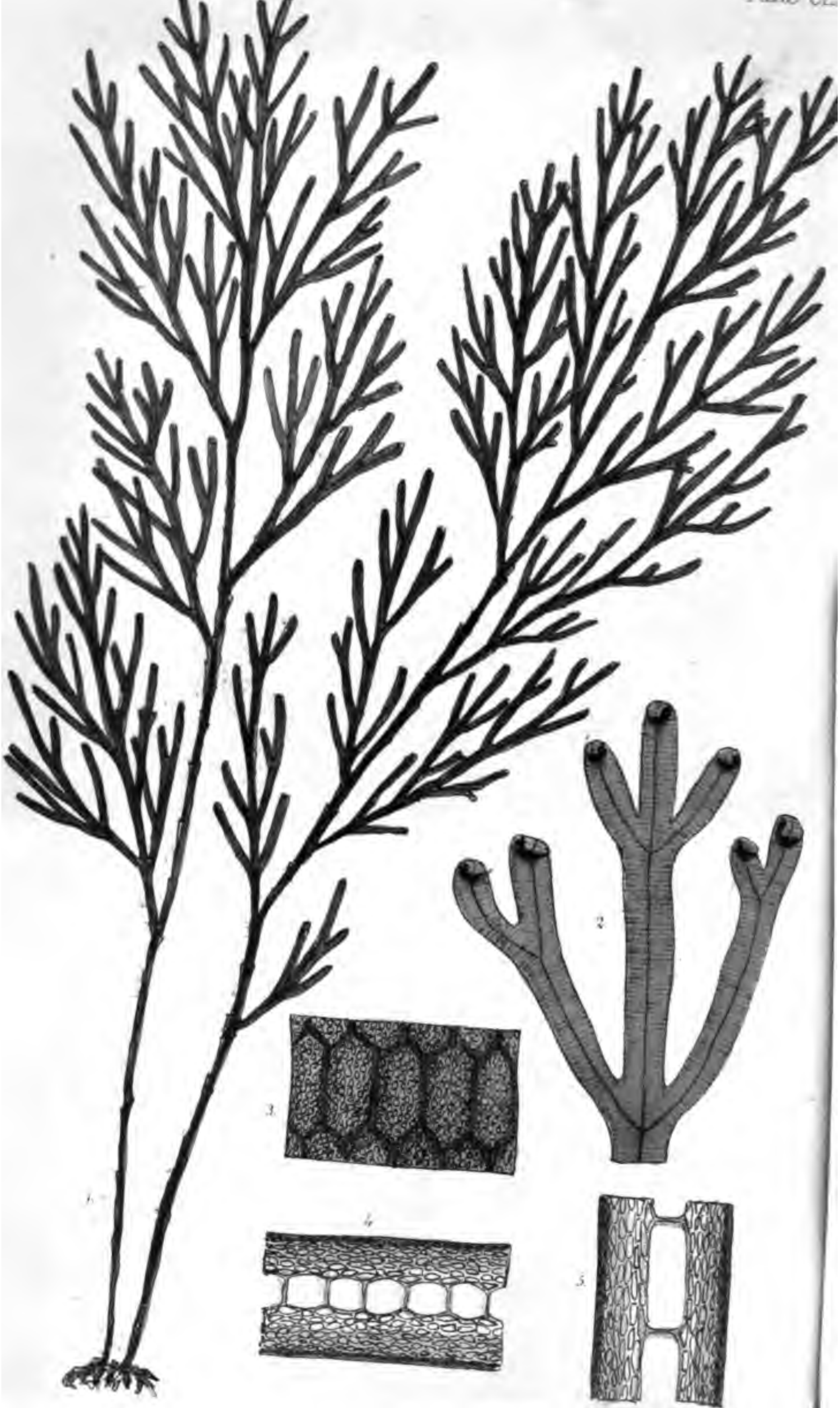
GEOGR. DISTR. Victoria. Rivers on the east coast of North America.

DESCR. *Fronds* ½–1 inch long, forming patches or tufts, rising from creeping filaments. *Stems* erect, bipinnated, with subdistant, alternate branches, forming a frond of ovate outline. *Pinnules* simple or forked, or alternately ramulous, with few ramuli, acute or acuminate. *Cells* in one row, about 6 (or 8) in the circle; those of the ramuli once and a half to nearly twice as long as broad, those of the main stems nearly square, all with a dark purple endochrome. *Stichidia* (immature) ending some of the ramuli, generally the lower ones, incurved or falcate. *Colour* rather a pale purple, varying in intensity as the plant grows in salter or fresher water. *Substance* rigid. In drying it does not adhere to paper, and loses both gloss and colour.

The Australian specimens here figured seem to agree very nearly with those from North America, with which I venture to associate them specifically.

Fig. 1. BOSTRYCHIA RIVULARIS, on a piece of stick,—*the natural size.* 2. A frond. 3. Part of a branch. 4. Cross section. 5. A *young* stichidium :—*magnified.*

Plate CL



[illegible]

Ser. RHODOSPERMEÆ. Fam. *Rhodomelaceæ.*

PLATE CLXXVII.

KUETZINGIA ANGUSTA, *Harv.*

GEN. CHAR. *Frond* flat, linear, pinnatifid, corticate, midribbed, and transversely striate. Interior cells empty, uniseriate, tetrahedral, arranged in transverse rows; cortical layer thick, of many rows of minute coloured cellules. *Ceramidia* unknown! *Stichidia* oblong, pedicellate, rising from the transverse striæ, containing tetraspores in a double row.—KUETZINGIA (*Sond.*), in honour of Prof. F. T. Kützing, the celebrated author of 'Phycologia Generalis,' and other well-known works.

Frons plana, linearis, pinnatifida, corticata, costata, transversim striata. Cellulæ interiores hyalinæ, uniseriatæ, tetrahedræ, transversim ordinatæ; corticales pluriseriatæ, minimæ, coloratæ. Fruct.: 1, *ceramidia (ignota)*; 2, *stichidia oblonga, pedicellata, e striis transversis enata tetrasporas duplici serie foventia.*

KUETZINGIA *angusta;* stipes long, naked below, subsimple, ribbed and two-edged; pinnæ subdistant, erect, very narrow-linear, flat; pinnules opposite, with very slender midribs, with involute apices.

K. angusta; *stipite elongato basi nudo subsimplici costato ancipitique; pinnis distantibus alternis erectis angustissime linearibus planis parum compositis; pinnulis oppositis tenuissimis costulatis apicibus involutis.*

KUETZINGIA angusta, *Harv. in Trans. R. I. Acad. v.* 22. *p.* 538; *Alg. Austr. Exsic. n.* 131.

HAB. Cast ashore at Rottnest Island in winter, rare, *W. H. H.*

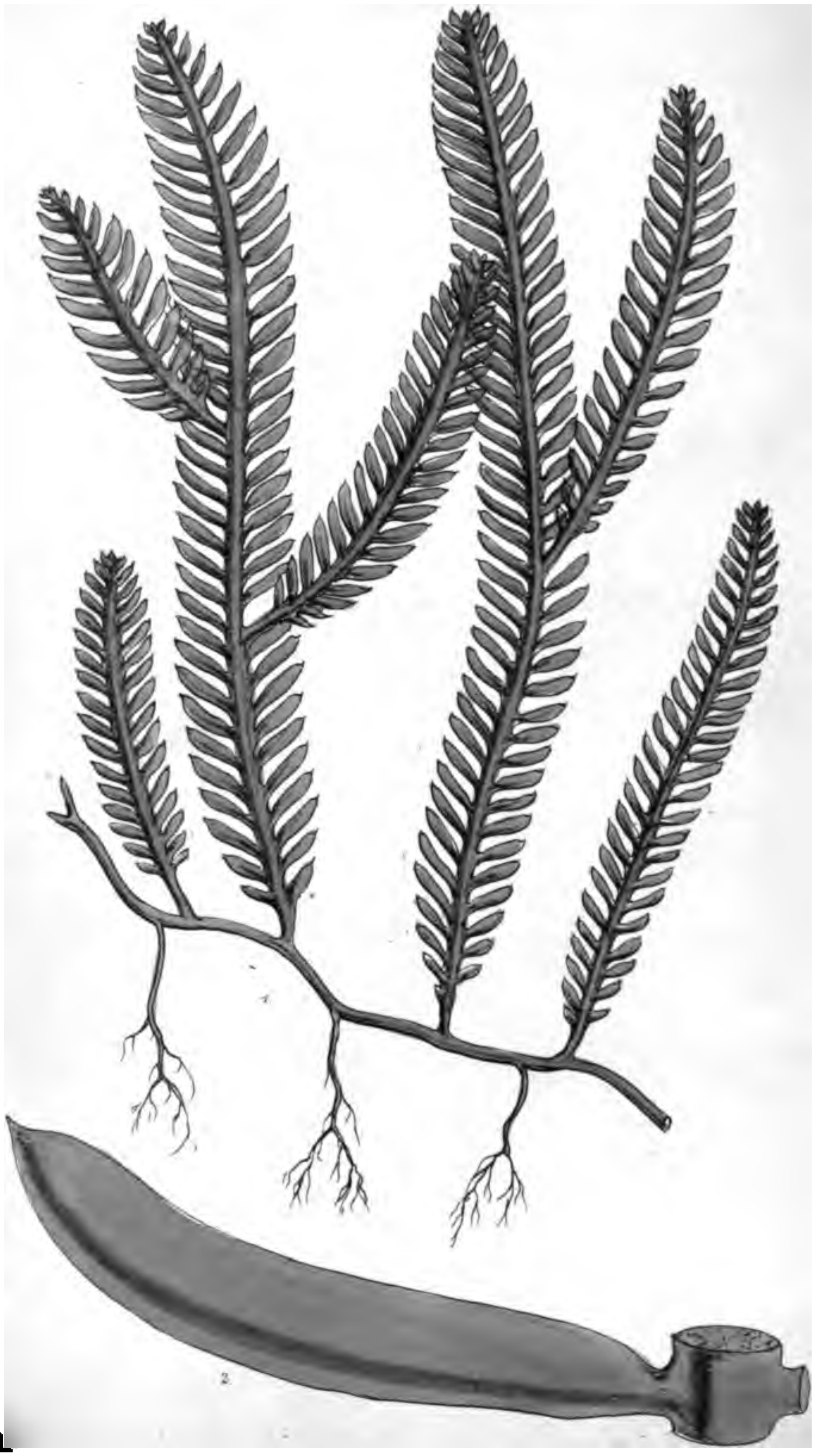
GEOGR. DISTR. Western Australia.

DESCR. *Root* branching. *Stem* 6–8 inches long, scarcely a line broad, simple or with one or few branches, flat, traversed by a thick midrib, generally bare of pinnæ, supporting a pinnately decompound frond which is 3–6 inches long and 2–4 wide. *Primary pinnæ* distant, and mostly alternate, 3–4 inches long, largely once or twice pinnatifid, all the divisions erect, with sharp axils. The *segments* are about a line wide, exactly linear, the older ones costate, the younger traversed by a very slender, hair-like midvein; they are normally opposite, but by suppression frequently alternate or secund. The *apices* are blunt and minutely inrolled. The *lamina* is everywhere closely transversely striate, and the structure is exactly that of *K. canaliculata.* No fruit has been observed. The *colour* when recent is a brownish purple or dull dark-red; in drying this changes to dark brown or blackish. The *substance* is coriaceo-membranous, and the *frond* does not adhere to paper in drying.

A rare and little-known plant, of which I obtained very few specimens, among *rejectamenta,* near the lighthouse, Rottnest Island. It differs from *K. canaliculata,* which is common in most parts of the Western Australian coast, by its much narrower, and perfectly flat (not channelled fronds), by its laxer and more slender growth, and minor less appreciable characters. No fruit has yet been seen, but its generic affinity to *K. canaliculata* can scarcely be doubted. The genus *Kuetzingia* is obviously nearly allied to *Rytiphlœa,* but differs in structure, and slightly in habit.

Fig. 1. KUETZINGIA ANGUSTA,—*the natural size.* 2. Apex of a pinna. 3. Portion of the surface. 4. Transverse section of the frond. 5. Longitudinal section :—*magnified.*

Plate CI



Vincent Brooks Im

PLATE CLXXVIII.

CAULERPA TAXIFOLIA, (*var.*,) *Ag.*

GEN. CHAR. *Frond* consisting of prostrate surculi, rooting from their lower surface, and throwing up erect branches (or secondary fronds) of various shapes. *Substance* horny-membranous, destitute of calcareous matter. *Structure* unicellular, the cell continuous, strengthened internally by a spongy network of anastomosing filaments, and filled with semifluid, grumous matter. *Fructification* unknown.—CAULERPA (*Lamx.*), from καυλος, *a stem*, and ἑρπω, *to creep.*

Frons ex surculis prostratis hic illic radicantibus et ramis erectis polymorphis formata. Substantia corneo-membranacea. Structura unicellulosa, cellulæ membrana continua hyalina intus filis cartilagineis tenuissimis anastomosantibus firmata et endochromate denso viridi repleta. Fr. ignota.

CAULERPA *taxifolia;* var. *asplenioides;* surculus glabrous; fronds erect, subsessile, simple or branched, pectinato-pinnatifid; rachis plano-compressed; pinnæ opposite, two-edged, linear-falcate, mucronate, constricted at base, entire at the margin.

C. taxifolia, *var.* asplenioides; *surculo glabro; frondibus erectis subsessilibus simplicibus v. ramosis pectinato-pinnatifidis; rachide plano-compresso; pinnis oppositis ancipitibus lineari-falcatis mucronatis basi constrictis integerrimis.*

CAULERPA taxifolia, *Ag. Sp. Alg. v.* 1. *p.* 435; *Syst. p.* 180. *Kütz. Sp. Alg. p.* 495.

CAULERPA pennata, *Lamour. Journ. Bot.* 1809, *p.* 143. *t.* 2. *f.* 2.

CAULERPA asplenioides, *Grev. Ann. Nat. Hist. ser.* 2. *v.* 12. *p.* 2. *t.* 1. *f.* 1.

FUCUS taxifolius, *Vahl.*

FUCUS pinnatus, *Linn. Suppl. p.* 452, *ex parte?*

HAB. Albany Island, north-eastern Australia, *Dr. Ferd. Mueller.*

GEOGR. DISTR. The tropical seas generally, on coral reefs and stems of mangrove. East and West Indies. Red Sea. Islands of the tropical Pacific. Hongkong.

DESCR. *Surculus* as thick or twice as thick as hog's-bristle, several inches long, rooting at subdistant intervals, the root deeply descending. *Fronds* 3–6 inches long or more, either quite simple or branched by lateral innovations, the branches irregular, 3–4 inches long, similar to the main frond. A very short stipes, 2–6 lines long, at the base of the frond, is bare of pinnæ; thence, upwards to the apex, the rachis is closely pectinato-pinnated with opposite, nearly equal, lanceolate-linear, acute, sub-incurved, and falcate, vertically flattened pinnæ, ½–1 line wide, 2–4 lines long. The *colour* is a brilliant, rather yellowish green; that of the rachis somewhat orange. The surface is glossy. The *substance* is softly membranous, and the plant partly adheres to paper in drying.

The plant here figured appears to be obviously referable to Greville's *C. asplenioides,* though the growth be more luxuriant and the pinnules proportionably longer. Dr. Greville, in the Annals of Nat. Hist., has correctly figured *typical* specimens of the plants, which he regards as distinct species, under the names "*taxifolia*" and "*asplenioides,*" and formerly I coincided with him in upholding both these forms as species. But having myself collected the var. "*asplenioides*" in abundance at Ceylon, and in different localities at the Friendly Islands, and received both it and the var. "*taxifolia*" from various correspondents, I find so much variation in both, and so many puzzlingly intermediate forms, that I am forced to unite all under one name. There is fully as much difference among my Friendly Island specimens, between those collected in the quiet waters of the lagoon and those from the outer reef, as I find in those from opposite hemispheres. Again, on some of my West Indian specimens (from Miss Dix) of "*C. taxifolia,*" some of the ramuli taper gradually to the point, and others are obtuse and mucronulate: a similar variation occurs in Mr. Wright's specimen of "*C. asplenioides,*" from Hongkong. Kützing's "*C. falcata,*" from western Africa, is quite like ordinary forms of *C. taxifolia;* so also is the figure of "*C. pennata,*" Lamx., as above quoted. I am not acquainted with Greville's "*C. pinnata.*"

Fig. 1. CAULERPA TAXIFOLIA,—*the natural size.* 2. One of the pinnæ,—*magnified.*

Plate CLXXIX.

DELESSERIA FRONDOSA, *Hook. fil. et Harv.*

Gen. Char. *Frond* leaf-like, membranous, areolated, symmetrical, simple or branched, midribbed. *Fructification:* 1, hemispherical *conceptacles,* sessile on the midrib or on a lateral nerve, containing a tuft of moniliform spore-threads on a basal placenta; 2, tripartite *tetraspores,* in definite sori or spots, on the frond or on accessory leaflets.—Delesseria (*Ag.*), in honour of Baron Delessert, a distinguished patron of botany.

Frons foliacea, membranacea, areolata, symmetrica, simplex v. ramosa, costata. Fruct.: 1, *coccidia in costa venisque frondis sessilia, hemisphærica, fila sporifera moniliformia a placenta basali emissa foventia;* 2, *tetrasporæ triangule divisæ, in soros definitos collectæ.*

Delesseria *frondosa;* frond subsessile, repeatedly pinnatifid (very variable in breadth and outline), curled or plain, the marginal lobes rounded or obtuse, serrulate; midrib vanishing upwards, ribs of the laciniæ and their lobes obsolete at base and apex; cystocarps solitary on the midribs of the ultimate segments, apiculate; sori in rows along the margin of the smaller segments.

D. frondosa; *fronde subsessili decomposite pinnatifida (polymorpha, angusta v. latissima, ovata v. lineari-lanceolata, etc.) crispata v. planiuscula, lacinulis apice rotundatis margine serrulatis; costa superne evanescente, costulis laciniarum et lacinularum basi et apice obsoletis; cystocarpiis in costa lacinularum solitariis sessilibus apiculatis; soris secus marginem lacinularum seriatis.*

Delesseria frondosa, *Hook. fil. et Harv. Lond. Jour. Bot. v.* 6. *p.* 403. *J. Ag. Sp. Alg. v.* 2. *p.* 689. *Harv. in Hook. fil. Fl. Tasm. v.* 2. *p.* 312; *Alg. Austr. Exsic. n.* 284.

Hemineura frondosa, *Harv. Ner. Austr. p.* 116. *t.* 45.

Hypoglossum frondosum, *Kütz. Sp. Alg. p.* 876.

Hab. In deep water. Very abundant on the coasts of Victoria and of Tasmania; rarer, and of small size in Western Australia.

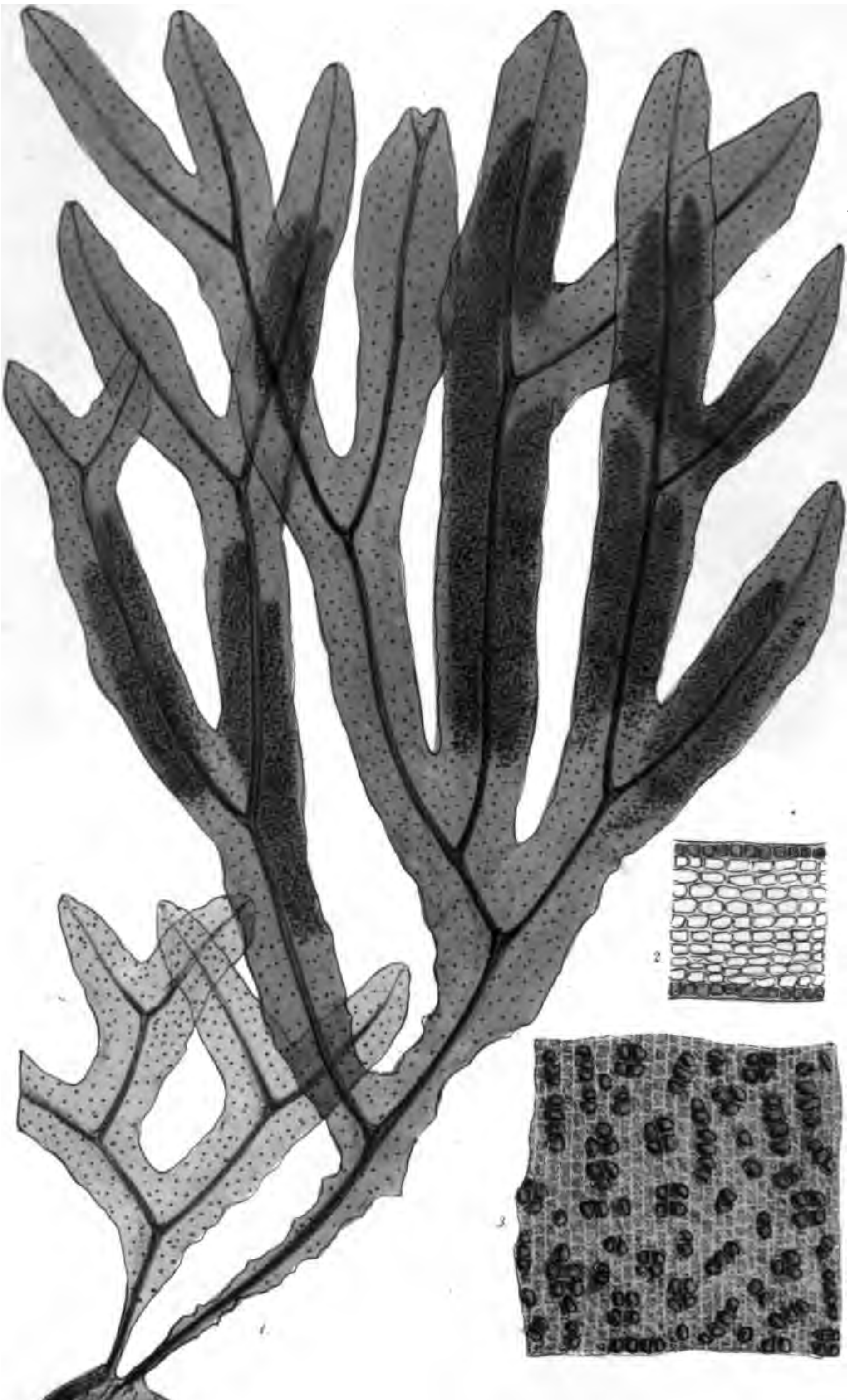
Geogr. Distr. Western and southern coasts of New Holland. Tasmania.

Descr. *Root* a small disc. *Fronds* tufted or solitary, 3–6–12–24 inches long, and as much in breadth, sometimes nearly simple, sometimes excessively compound, always on an alternately pinnatifid type. *Stem* scarcely any, except in very old and partly denuded fronds. *Primary leaf* varying from ovate or oblong to lanceolate and narrow-linear, with an immersed, nearly percurrent midrib, which is broad and strongly marked below, but becomes narrower and fainter upwards, and almost or quite vanishes just below the summit. The *lateral laciniæ* are short or long, and usually linear, but either broad or narrow, traversed by a midrib which disappears opposite the point where they separate from the principal leaf, and also below their apices: these midribs, vanishing at base and apex, are found in all the smaller subdivisions of the frond. The *margin*, especially in the narrower varieties, is sharply serrulate. *Cystocarps* hemispherical, apiculate, one on the rib of an ultimate lacinia, near its base. *Sori* arranged along the margin of the lesser laciniæ, at each side of their costulæ. *Colour* a rosy red, often much diluted. *Substance* softly membranous, but not gelatinous, bearing long immersion in fresh-water without injury. In drying the plant firmly adheres to paper.

This is one of the most variable of all the Australian Rhodosperms, and also one of the commonest. Under all its varieties it may be known by the peculiar nervation, the midrib failing *below* the apex of the frond, and *every* lateral nerve disappearing *opposite* the base and below the apex of the lobe of the frond through whose centre it runs. The margin is generally sharply serrulate, but sometimes nearly entire. Sometimes the frond is very coarse in texture, sometimes soft and delicate, sometimes crowded with imbricating lobes and lobules, and sometimes laxly and distantly laciniate. It would be a vain task to attempt to describe or figure the varieties: the student will gradually recognize the species under every mask, by keeping in mind the characters of venation above pointed out.

Fig. 1. DELESSERIA FRONDOSA,—*the natural size.* 2. Apex of a frond, with cystocarps *in situ.* 3. Vertical section of cystocarp and lamina. 4. Spore-threads. 5. Apex of a frond, with *sori.* 6. A *sorus,* and part of the membrane:—more or less *magnified.*

Plate CLXII



Vincent Brooks Imp.

PLATE CLXXX.

HALISERIS MUELLERI, *Sond.*

GEN. CHAR. *Root* coated with woolly hairs. *Frond* flat, linear, dichotomous, membranaceous, midribbed. *Fructification: spores* collected in naked *sori,* disposed in lines at each side of the midrib, and rising from both surfaces of the frond. *Paranemata* separate from the sporiferous sori, *articulate,* club-shaped.—HALISERIS (*Targ.*), from ἅλς, *the sea,* and σερις, *endive.*

Radix stuposa. Frons plana, linearis, dichotoma, membranacea, costata. Fruct., sporæ in soros nudos collectæ, in utraque pagina frondis sessiles. Paranemata in soris propriis evoluta, articulata, clavata.

HALISERIS *Muelleri;* stipes elongate, terete; frond dichotomous, with rounded axils; segments spreading, coriaceo-membranaceous, broadly linear, very entire, repeatedly forked; membrane nerveless; sori very large, forming a continuous cloud-like patch, covering the whole surface.

H. Muelleri; *stipite longiusculo terete stuposo; fronde dichotoma, sinubus rotundatis, laciniis patentibus coriaceo-membranaceis lato-linearibus integerrimis repetite furcatis; lamina enervi; soris maximis paginam fere totam frondis occupantibus.*

HALISERIS Muelleri, *Sond. in Linn. v.* 25. *p.* 665. *Harv. Alg. Austr. Exsic. n.* 87. *Fl. Tasm. v.* 2. *p.* 290.

HALISERIS polypodioides, *Harv. in Lond. Journ. v.* 6. *p.* 415 (*excl. syn.*).

HAB. Fremantle, King George's Sound, and Cape Riche, Western Australia, *W. H. H.* Coasts of southern Australia and Victoria, *Dr. Mueller, W. H. H., etc.* Port Jackson, New South Wales, *W. H. H.* Tasmania, *R. Gunn, etc.*

GEOGR. DISTR. Very common on the western and southern coasts of New Holland and in Tasmania. Rare on the east coast.

DESCR. *Root* conical, densely coated with entangled woolly fibres. *Stipes* variable in length, in old fronds 2–3 inches long, simple or branched, covered with woolly hairs, which also clothe the midrib in the lower half of the frond. *Frond* 6 to 18 or 24 inches long, very much divided, either regularly dichotomous; or partly dichotomous, partly alternately branched by a suppression of one of the forks, all the divisions patent, sometimes divaricate, with wide sinuses between the lobes. The *segments* are an inch or somewhat less in breadth, linear, flat, and quite entire at the edge, simple or forked, long or short, either very blunt or subacute. The *midrib* is strongly marked throughout, but there are no lateral veins or veinlets. The *sori* (of *anthe-*

ridia?) form very large, continuous, cloud-like patches, 2–4 inches long, covering the whole lamina, at both sides of the midrib, often for half the length of the lobe. The *membrane* is of a thickish, half-coriaceous substance, not very readily tearing, and is everywhere dotted with muciferous spores. The *colour* is a full olive or olivaceous-brown, pretty well preserved in drying; in which state the frond imperfectly adheres to paper.

In several respects this species resembles the European *H. polypodioides,* with which I formerly confounded the first imperfect specimens sent from Australia, many years ago, by Mr. Gunn. But it has a much more firmly membranous and almost coriaceous lamina, not often tearing into shreds, as is the habit of the European; and when in fructification the two cannot be mistaken. It has been named in compliment to Dr. Mueller, who first sent to Europe *fruiting* specimens. The young plant differs considerably in aspect from the mature, having shorter and broader and much blunter laciniæ, and being of a paler colour. Specimens from tide-pools are often much stunted; those from deep water much taller, but sometimes very narrow.

Fig. 1. HALISERIS MUELLERI,—*the natural size.* 2. A section through the frond. 3. Part of the surface, with a portion of the *sorus*:—*magnified.*